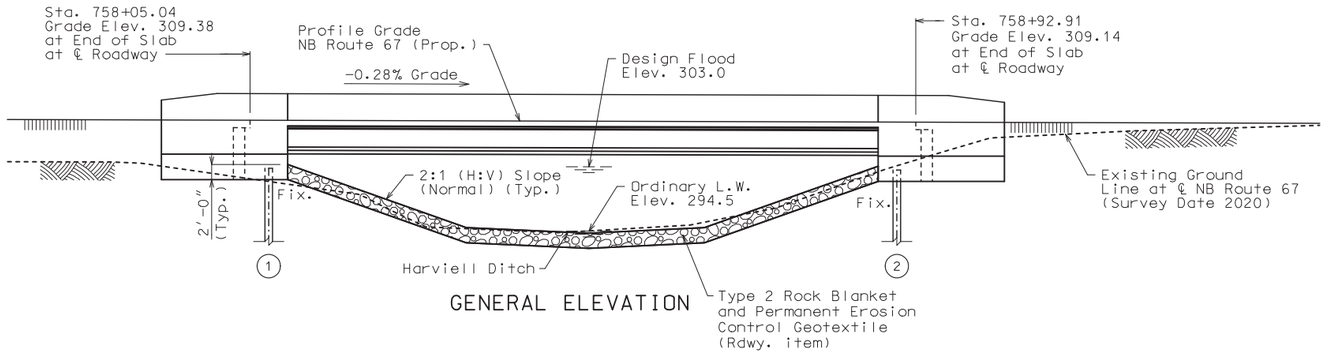
SEC./SUR. 28 TWP. 23N RGE. 5E

(82.9′) PRESTRESSED CONCRETE NU-GIRDER SPAN

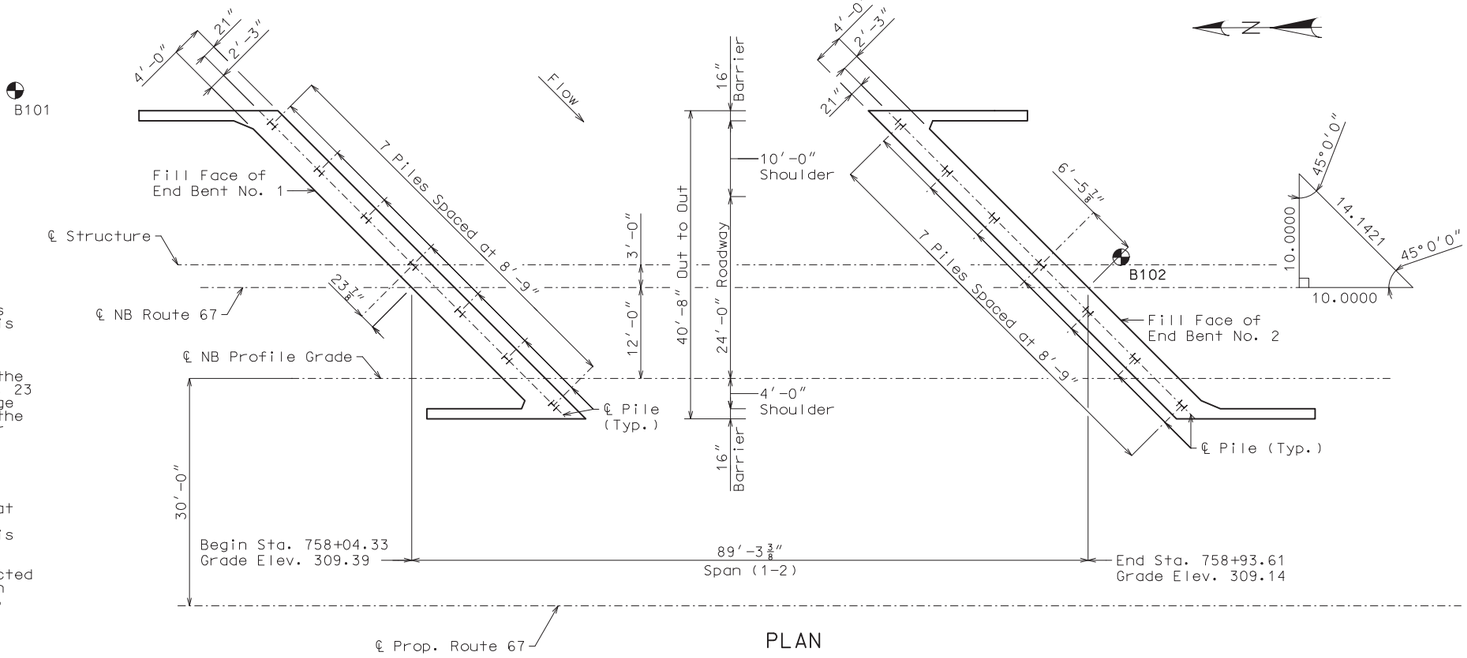


GENERAL ELEVATION

Notes:

Roadway fill shall be completed to the final roadway section and up to the elevation of the bottom of the concrete beam within the limits of the structure and for not less than 25 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

Hydrologic Data
Drainage Area = 9.3 mi²
Design Flood Frequency = 50 years
Design Flood Discharge = 1,060 cfs
Design Flood (D.F.) Elevation = 303.0
Base Flood (100-year)
Base Flood Elevation = 303.5
Base Flood Discharge = 1,210 cfs
Estimated Backwater = 0.1 ft
Average Velocity thru Opening = 2.5 ft/s
Freeboard (50-year)
Freeboard = 1.4 ft
Roadway Overtopping
Overtopping Flood Discharge = N/A
Overtopping Flood Frequency = >500 years
500 Year Flood Elevation = 304.8



PLAN

℄ Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

The locations of all subsurface borings for this structure are shown on the plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, are shown on Sheet(s) No. 23 & 24 and may be included in the Electronic Bridge Deliverables. They will also be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.

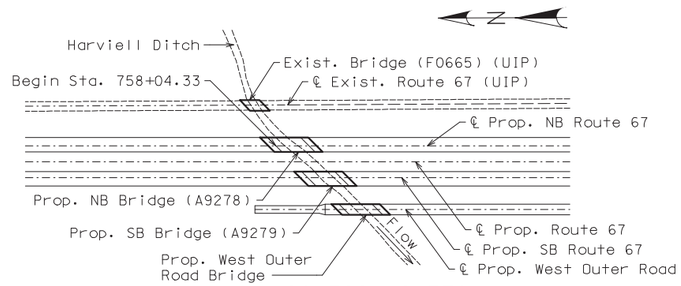
General Notes:

Longitudinal dimensions are measured horizontal.

For General Notes, Estimated Quantities and Foundation Data see Sheet No. 2.

B.M. #32
N: 282085.74
E: 814254.75
Sta. 719+83.75 Exist. Rte 67
Elev. 308.27
Chisled "□" on SW corner of west barrier curb on bridge F0665

Control Point #129
N: 281264.97
E: 814315.18
Sta. 728+04.49 Exist. Rte 67
Elev. 302.52
5/8" rebar with MoDOT cap



LOCATION SKETCH

BRIDGE: ROUTE 67 NB OVER HARVIELL DITCH

ROUTE 67 FROM ROUTE 158 TO ROUTE 142
ABOUT 3.2 MILES NORTH OF ROUTE 142
BEGINNING STATION 758+04.33 (℄ NB ROUTE 67)

GENERAL PLAN AND ELEVATION

Designed Sep. 2022
Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

JOSHUA D. JOLLIFF NUMBER PE-2006002824 STATE OF MISSOURI PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	1

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9278

DATE	DESCRIPTION	REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

General Notes:

Design Specifications:

2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)
2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design (2nd Ed.) and 2014 Interim Revisions (Seismic)
Seismic Design Category = C
Design earthquake response spectral acceleration coefficient at 1.0 second period, S_{D1} = 0.34
Acceleration Coefficient (effective peak ground acceleration coefficient), A_S = 0.37

Design Loading:

Vehicular = HL-93
Future Wearing Surface = 35 lb/sf
Earth = 120 lb/cf
Equivalent Fluid Pressure = 45 lb/cf (Min.)
Superstructure: Non-composite for dead load. Composite for live load.

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-2 Concrete (Superstructure, except Prestressed Girders and Barrier)	f'c = 4,000 psi
Class B-1 Concrete (Barrier)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Steel HP Pile (ASTM A709 Grade 50S)	fy = 50,000 psi

For precast prestressed panel stresses, see Sheet No. 12.

For prestressed girder stresses, see Sheets No. 10 & 11.

Neoprene Pads:

Neoprene bearing pads shall be 60 durometer and shall be in accordance with Sec 716.

Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. Traffic to be maintained on other routes during construction. See roadway plans for traffic control.

Miscellaneous:

MoDOT Construction personnel will indicate the type of joint filler option used under the precast panels for this structure:

☐ Constant Joint Filler
☐ Variable Joint Filler

Estimated Quantities for Slab on Concrete NU-Girder

Item		Total
Class B-2 Concrete	cu. yard	161
Reinforcing Steel (Epoxy Coated)	pound	33,320

Notes:

The table of Estimated Quantities for Slab on Concrete NU-Girder represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard longitudinally from end of slab to end of slab and transversely from out to out of bridge slab (or with the horizontal dimensions as shown on the plan of slab). Payment for prestressed panels, conventional forms, all concrete and epoxy coated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

The Estimated Quantities for Slab on Concrete NU-Girder are based on skewed precast prestressed end panels.

Class B-2 Concrete quantity is based on minimum top flange thickness and minimum joint material thickness.

The prestressed panel quantities are not included in the table of Estimated Quantities for Slab on Concrete NU-Girder.

Estimated Quantities

Item		Substr.	Superstr.	Total
Class 1 Excavation	cu. yard	75		75
Bridge Approach Slab (Major)	sq. yard		171	171
Galvanized Structural Steel Piles (12 in.)	linear foot	1106		1106
Pile Point Reinforcement	each	14		14
Class B Concrete (Substructure)	cu. yard	62.1		62.1
Type D Barrier	linear foot		235	235
Slab on Concrete NU-Girder	sq. yard		398	398
NU 43, Prestressed Concrete NU-Girder	linear foot		335	335
Slab Drain	each		14	14
Vertical Drain at End Bents	each	2		2
Plain Neoprene Bearing Pad	each		8	8

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

Cost of L4x4 ASTM A709 Grade 36 HP pile anchors and 3/4-inch diameter ASTM F3125 Grade A325 Type 1 bolts, complete in place, will be considered completely covered by the contract unit price for Galvanized Structural Steel Piles (12 in.).

Foundation Data

Type	Design Data		Bent Number 1	Bent Number 2
Load Bearing Pile	Pile Type and Size		HP 12x53	HP 12x53
	Number	ea	7	7
	Approximate Length Per Each	ft	79	79
	Pile Point Reinforcement	ea	All	All
	Min. Galvanized Penetration (Elev.)	ft	281	281
	Pile Driving Verification Method		DF	DF
	Resistance Factor		0.4	0.4
	Minimum Nominal Axial Compressive Resistance	kip	523	523

DF = FHWA-modified Gates Dynamic Pile Formula

Load Bearing Pile:

$$\text{Minimum Nominal Axial Compressive Resistance} = \frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$$

All piles shall be galvanized down to the minimum galvanized penetration (elevation).

Pile point reinforcement need not be galvanized. Shop drawings will not be required for pile point reinforcement.

The contractor shall make every effort to achieve the minimum galvanized penetration (elevation) shown on the plans for all piles. Deviations in penetration less than 5 feet of the minimum will be considered acceptable provided the contractor makes the necessary corrections to ensure the minimum penetration is achieved on subsequent piles.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED: 3/3/2023
ROUTE: 67 | STATE: MO
DISTRICT: BR | SHEET NO.: 2
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

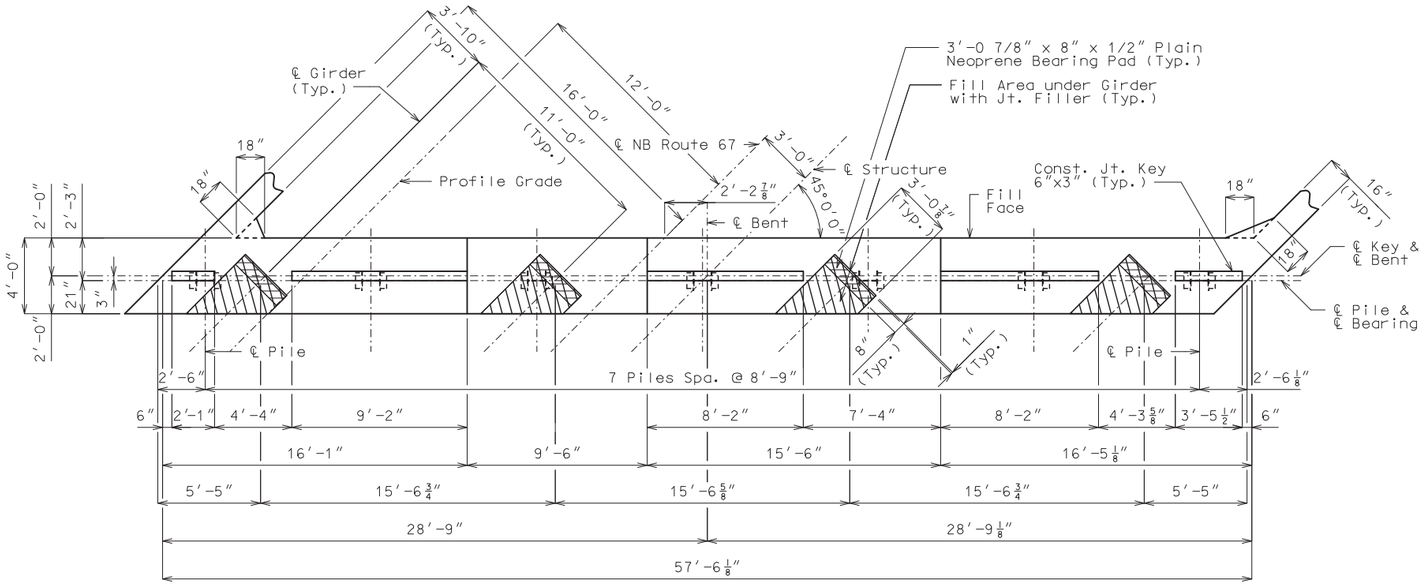
CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

ESTIMATED QUANTITIES AND GENERAL NOTES

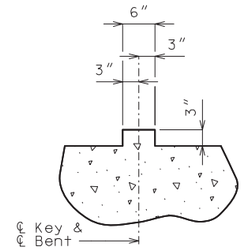
Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

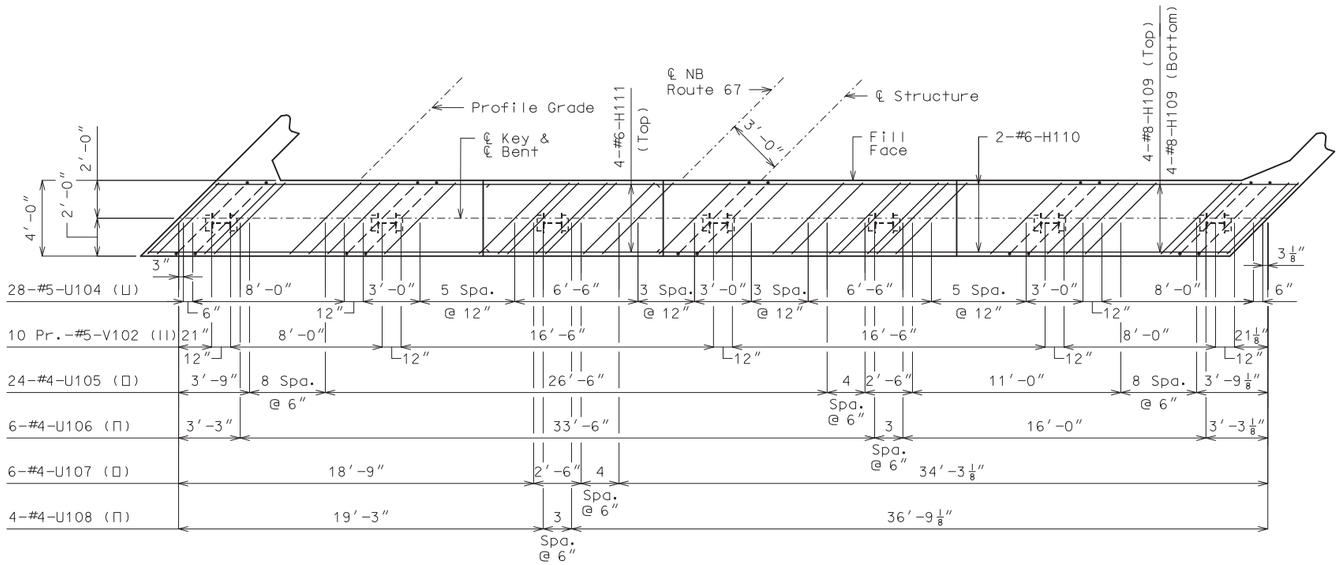
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_002_J9P3751_Estimated_Quantities_and_General_Notes.dgn 8:57:57 AM 3/3/2023



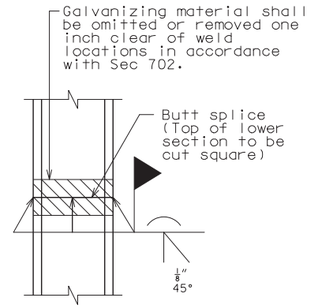
PLAN OF BEAM SHOWING DIMENSIONS



TYPICAL SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT
(Keys not shown for clarity)



STEEL PILE SPLICE
(If required)

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 4 & 5.

For details of Vertical Drain at End Bents, see Sheet No. 6.

The U bars and pairs of V bars shall be placed parallel to centerline of roadway.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

DETAILS OF END BENT NO. 1

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED
3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	3

COUNTY
BUTLER

JOB NO.
J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9278

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

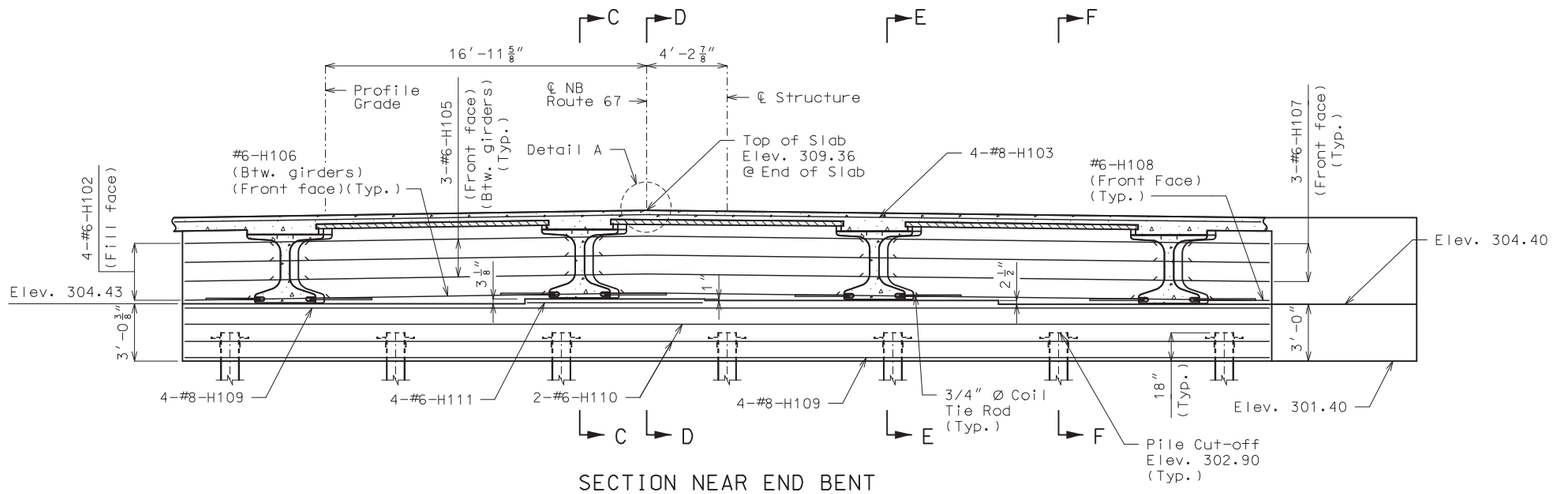
REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

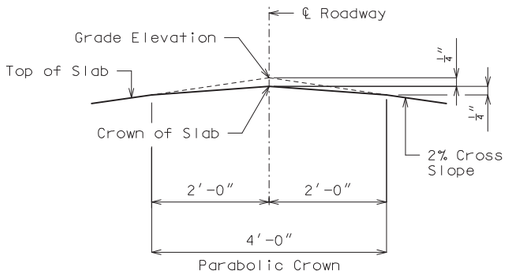
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_003_J9P3751_End_Bent_1_Details.dgn 8:57:58 AM 3/3/2023



SECTION NEAR END BENT

Keys not shown for clarity.



DETAIL A

PART PLAN

✳ Centered behind girders

DETAILS OF END BENT NO. 1

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 3 & 5.

For Sections C-C, D-D, E-E, & F-F, see Sheet No. 5.

For Elevations A-A & B-B, see Sheet No. 5.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For location of Coil Tie Rods and #5-H104 (Strand Tie Bar), see Sheets No. 10 and 11.

For details of Vertical Drain at End Bents, see Sheet No. 6.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2″.

The #6-F100 and #6-F101 bars shall be bent in the field to clear girders.

The U bars shall be placed parallel to centerline of roadway.

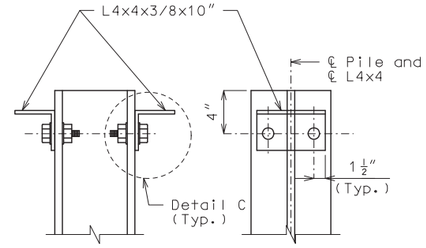
Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

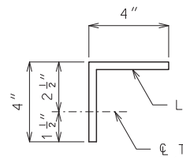
For details of Bridge Approach Slab, see Sheet No. 19.

Substructure Quantity Table for Bent No. 1		
Item		Quantity
Class 1 Excavation	cu. yard	10
Galvanized Structural Steel Piles (12 in.)	linear foot	553
Pile Point Reinforcement	each	7
Class B Concrete (Substructure)	cu. yard	31.0

Note: These quantities are included in the Estimated Quantities table on Sheet No. 2.



DETAILS OF HP PILE ANCHORS



DETAIL C

Angles shall be coated with a minimum of two coats of non-aluminum epoxy mastic primer to provide a dry film thickness of 4 mils minimum, 8 mils maximum, or galvanized in accordance with Sec 1081. Bolts, washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	4

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9278

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

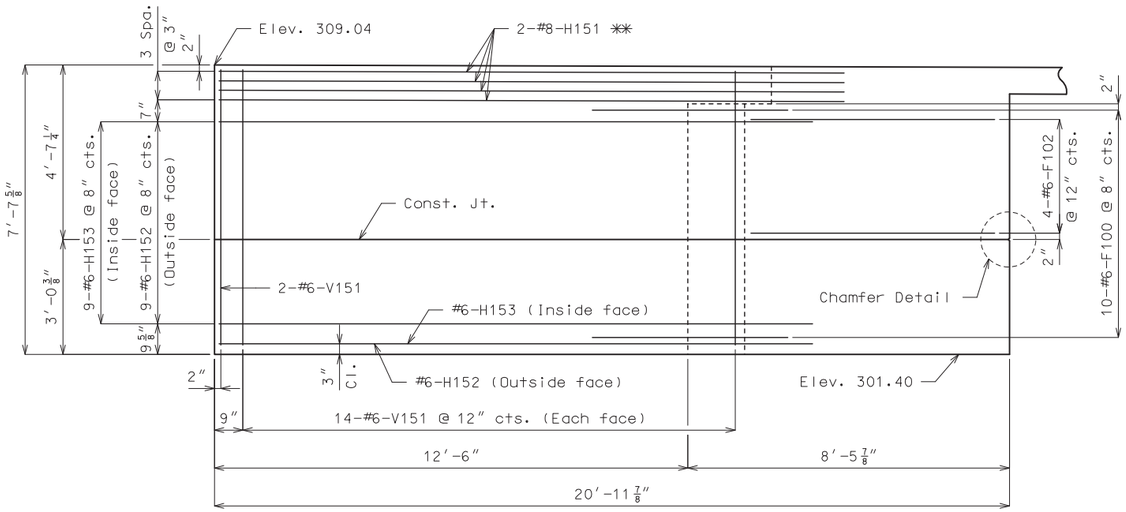
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

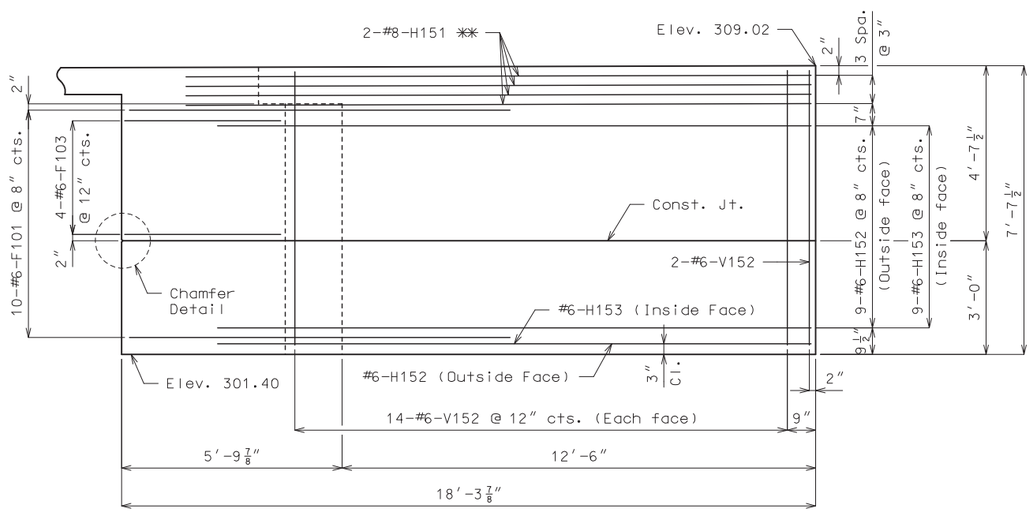
Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_004_J9P3751_End_Bent_1_Details.dgn 8:57:59 AM 3/3/2023

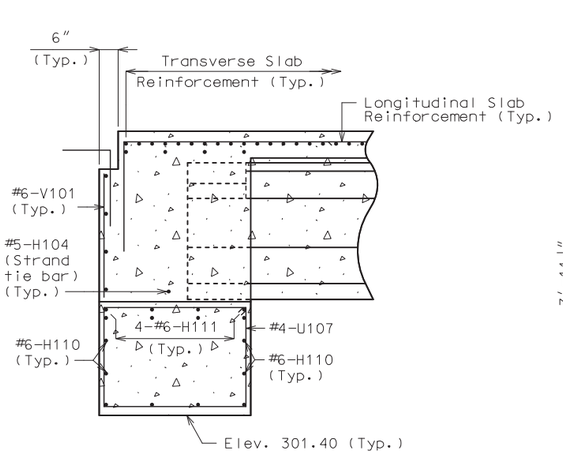


ELEVATION A-A

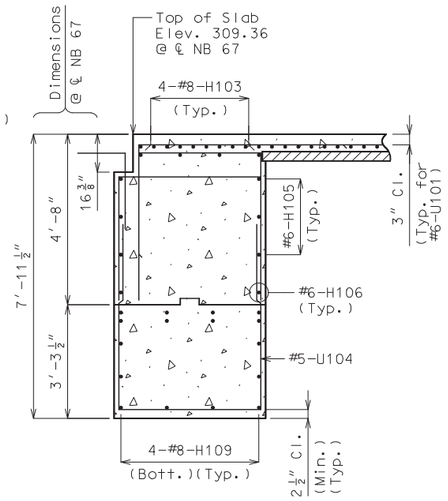


ELEVATION B-B

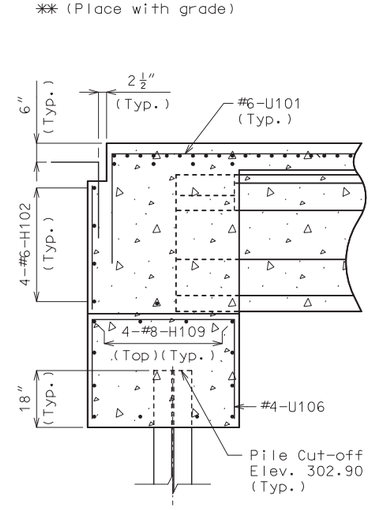
** (Place with grade)



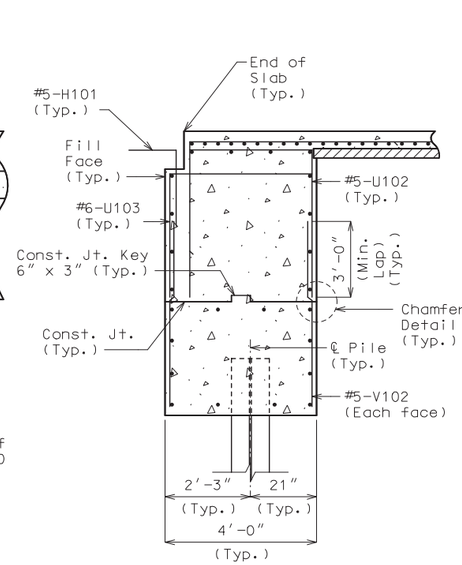
SECTION C-C



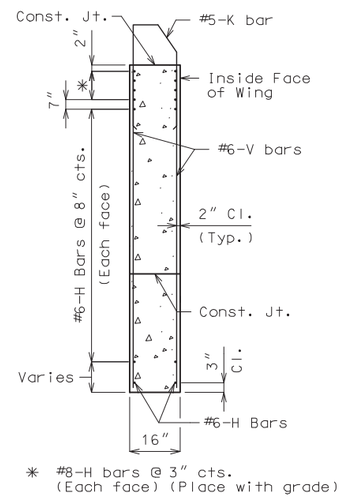
SECTION D-D



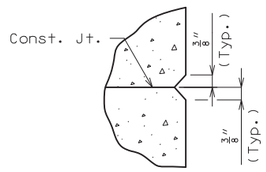
SECTION E-E



SECTION F-F



TYPICAL SECTION THRU WING



CHAMFER DETAIL

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 3 & 4.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

The #6-F100 and #6-F101 bars shall be bent in field to clear girders.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Vertical Drain at End Bents, see Sheet No. 6.

For location of #5-H104 (Strand tie bar), see Sheets No. 10 and 11.

For location of Sections C-C, D-D, E-E, & F-F, see Sheet No. 4.

For location of Elevations A-A & B-B, see Sheet No. 4.

For details of Bridge Approach Slab, see Sheet No. 19.

DETAILS OF END BENT NO. 1

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	5

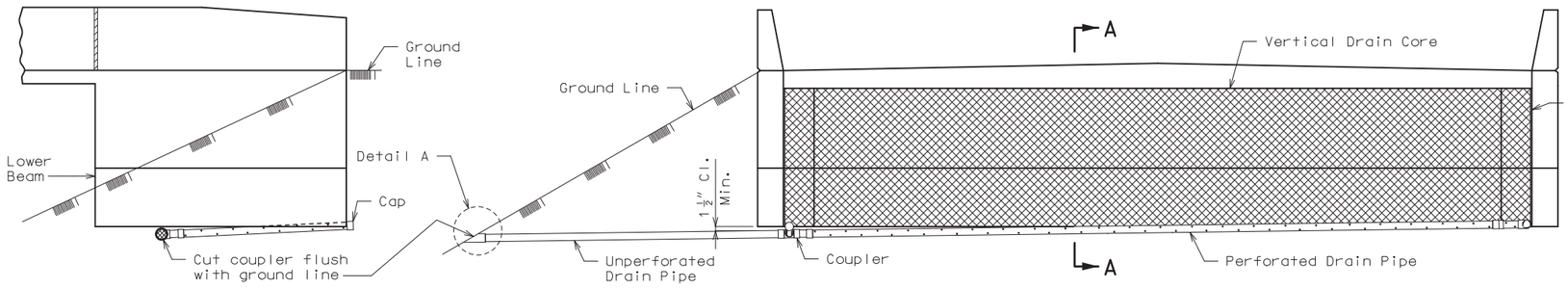
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9278

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

DESCRIPTION | DATE | REV.

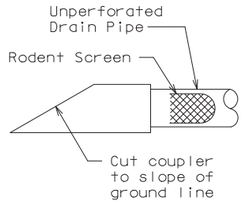
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

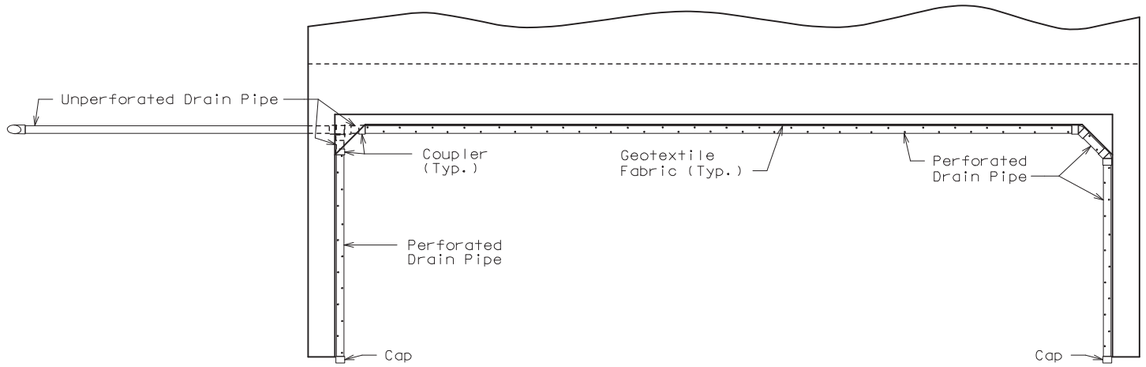


ELEVATION OF WING

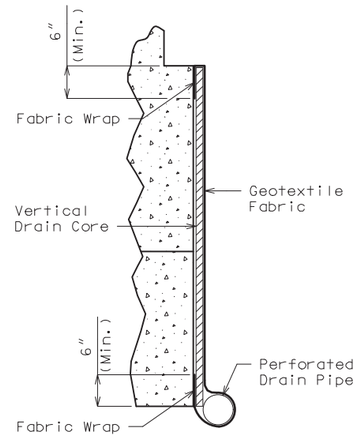
ELEVATION OF END BENT



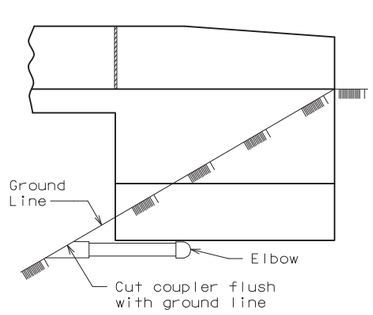
DETAIL A



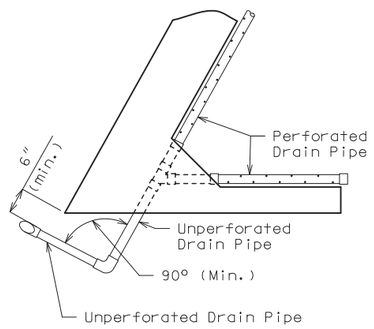
PLAN OF END BENT



PART SECTION A-A
(Section thru wing similar)



ELEVATION OF WING



PART PLAN

OPTIONAL TURNED DRAIN
(Use only when straight drain is not practical.)

General Notes:

All drain pipe shall be sloped 1 to 2 percent.

Drain pipe may be either 6-inch diameter corrugated metallic-coated steel pipe underdrain, 4-inch diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4-inch diameter corrugated polyethylene (PE) drain pipe.

Drain pipe shall be placed at fill face of end bent and inside face of wings. The pipe shall slope to lowest grade of ground line, also missing the lower beam of end bent by a minimum of 1 1/2 inches.

Perforated pipe shall be placed at fill face side and inside face of wings at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.

VERTICAL DRAIN AT END BENTS

(Squared end bent shown, skewed end bent similar)

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	6

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

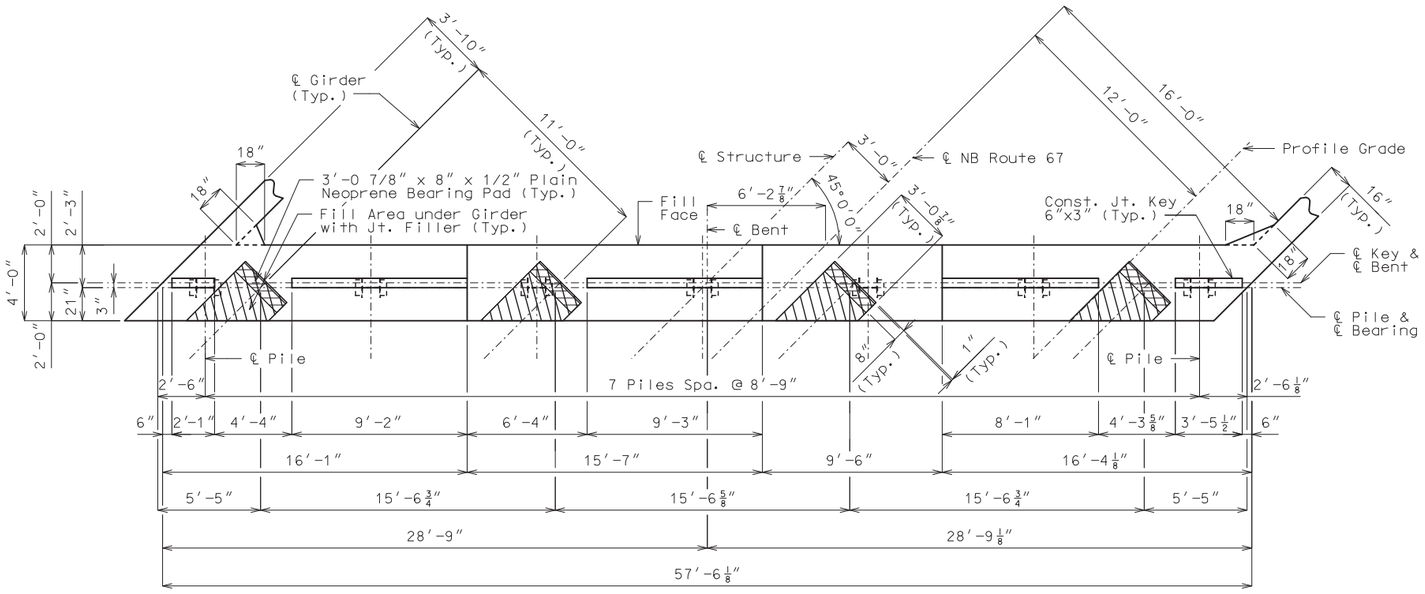
DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

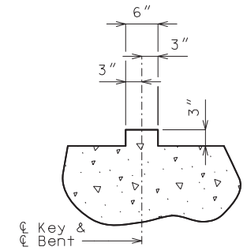
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

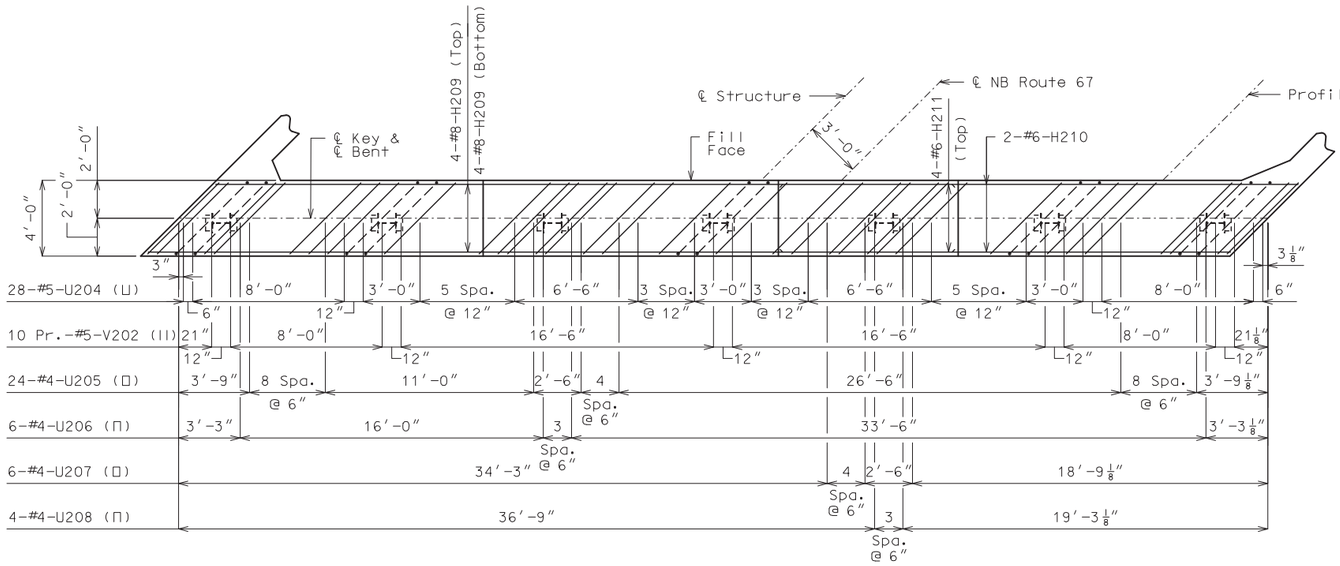
REV.



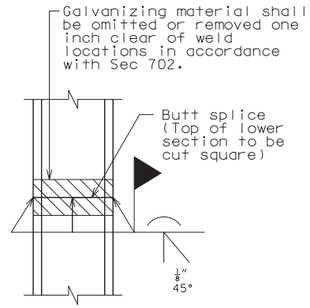
PLAN OF BEAM SHOWING DIMENSIONS



TYPICAL SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT
(Keys not shown for clarity)



STEEL PILE SPLICE
(If required)

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 8 & 9.

For details of Vertical Drain at End Bents, see Sheet No. 6.

The U bars and pairs of V bars shall be placed parallel to centerline of roadway.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

DETAILS OF END BENT NO. 2

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED
3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	7

COUNTY
BUTLER

JOB NO.
J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9278

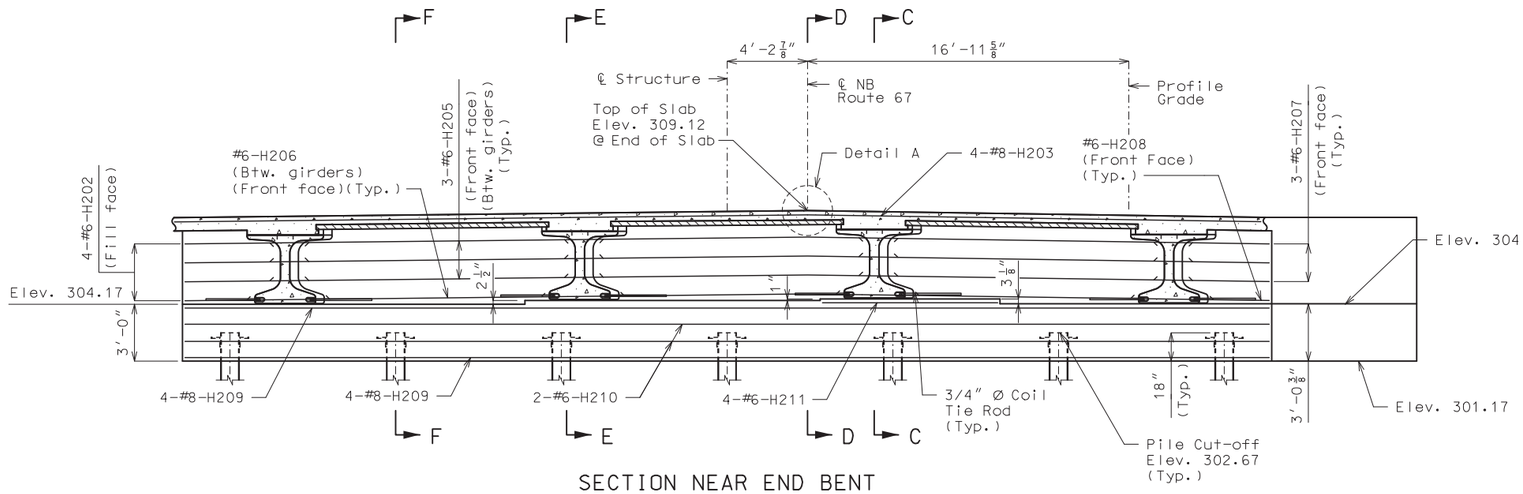
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

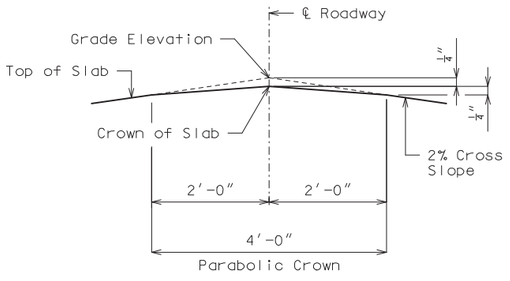
CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



SECTION NEAR END BENT

Keys not shown for clarity.



DETAIL A

PART PLAN

✳ Centered behind girders

DETAILS OF END BENT NO. 2

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 7 & 9.

For Sections C-C, D-D, E-E, & F-F, see Sheet No. 9.

For Elevations A-A & B-B, see Sheet No. 9.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For location of Coil Tie Rods and #5-H204 (Strand Tie Bar), see Sheets No. 10 and 11.

For details of Vertical Drain at End Bents, see Sheet No. 6.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2″.

The #6-F200 and #6-F201 bars shall be bent in the field to clear girders.

The U bars shall be placed parallel to centerline of roadway.

Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.

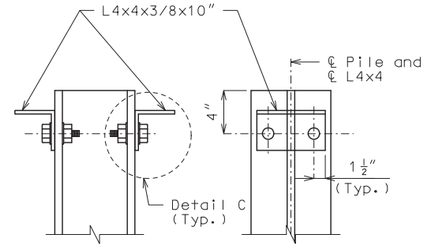
For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Bridge Approach Slab, see Sheet No. 19.

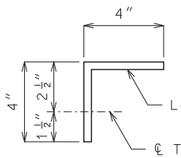
Substructure Quantity Table for Bent No. 2

Item		Quantity
Class 1 Excavation	cu. yard	65
Galvanized Structural Steel Piles (12 in.)	linear foot	553
Pile Point Reinforcement	each	7
Class B Concrete (Substructure)	cu. yard	31.1

Note: These quantities are included in the Estimated Quantities table on Sheet No. 2.



DETAILS OF HP PILE ANCHORS



DETAIL C

Angles shall be coated with a minimum of two coats of non-aluminum epoxy mastic primer to provide a dry film thickness of 4 mils minimum, 8 mils maximum, or galvanized in accordance with Sec 1081. Bolts, washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	8

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9278

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

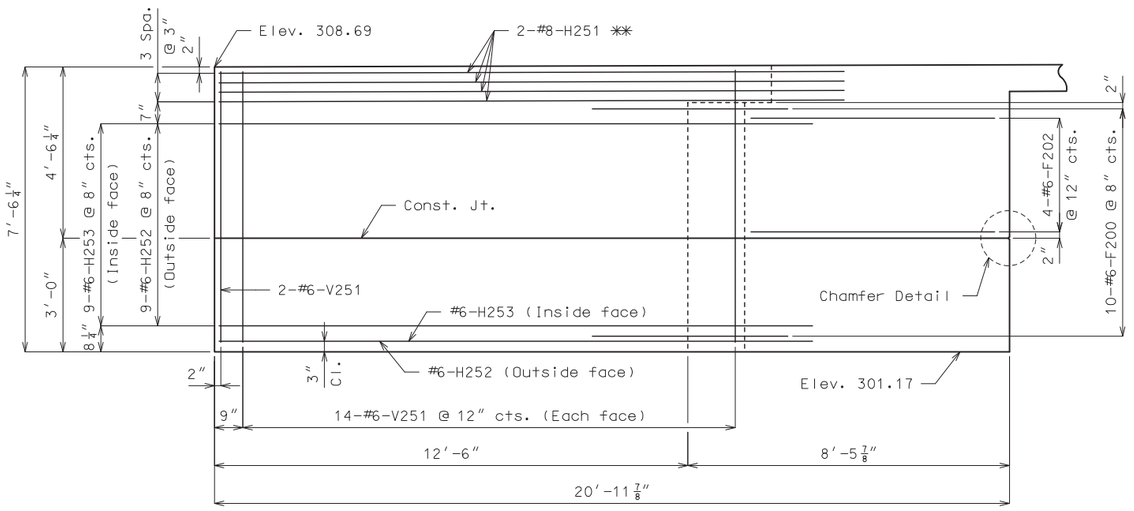
CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

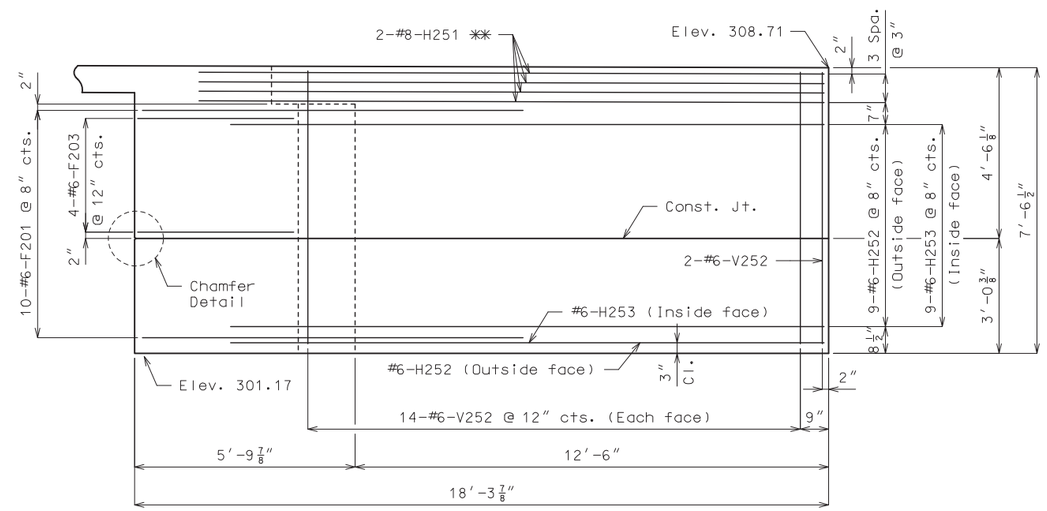
Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_008_J9P3751_End_Bent_2_Details.dgn 8:58:04 AM 3/3/2023

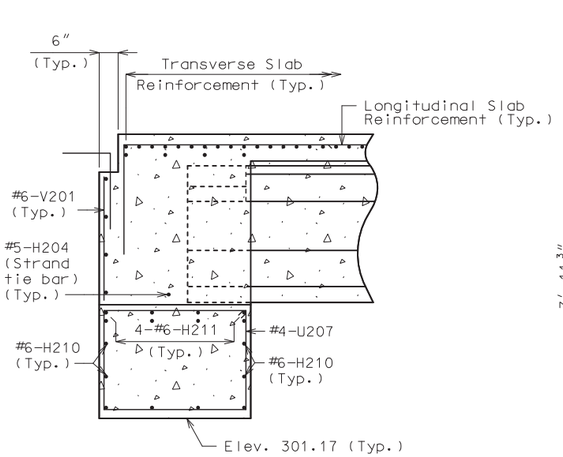


ELEVATION A-A

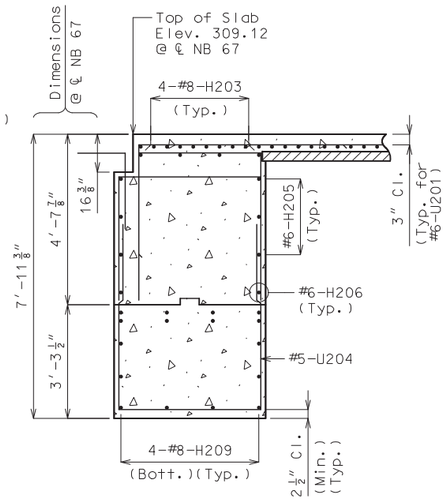


ELEVATION B-B

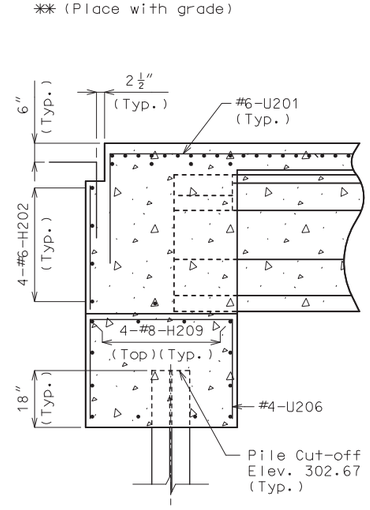
** (Place with grade)



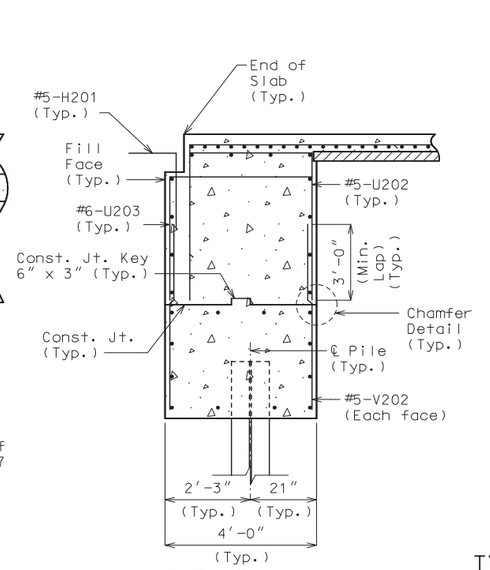
SECTION C-C



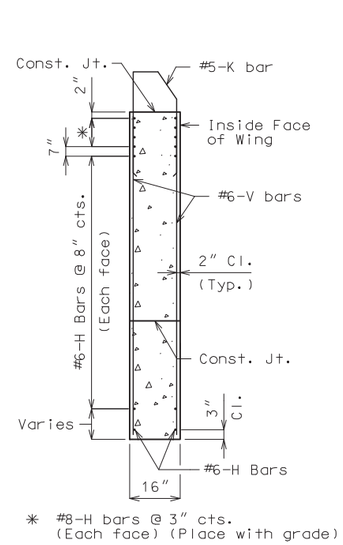
SECTION D-D



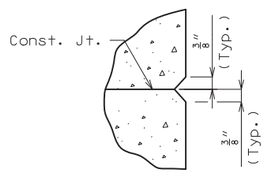
SECTION E-E



SECTION F-F



TYPICAL SECTION THRU WING



CHAMFER DETAIL

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 7 & 8.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

The #6-F200 and #6-F201 bars shall be bent in field to clear girders.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Vertical Drain at End Bents, see Sheet No. 6.

For location of #5-H204 (Strand tie bar), see Sheets No. 10 and 11.

For location of Sections C-C, D-D, E-E, & F-F, see Sheet No. 8.

For location of Elevations A-A & B-B, see Sheet No. 8.

For details of Bridge Approach Slab, see Sheet No. 19.

DETAILS OF END BENT NO. 2

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	9

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9278

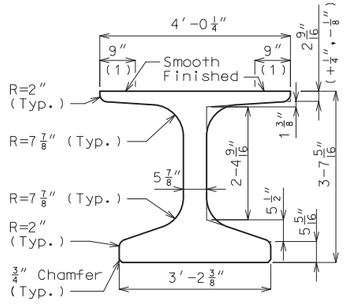
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

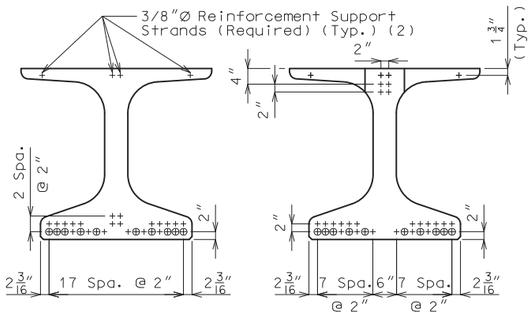
CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



DIMENSIONS

(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about ℄ Girder. May be moved laterally in pairs.

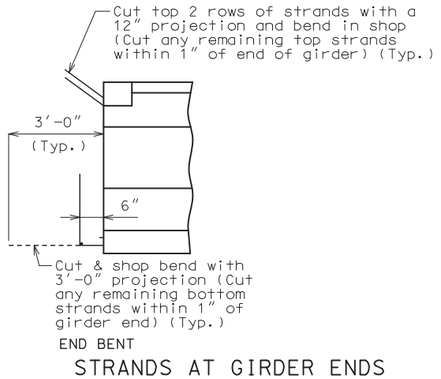


℄ GIRDER END OF GIRDER

STRAND ARRANGEMENT

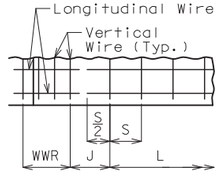
+ Indicates prestressing strand.

o Indicates cut & shop bend with 3′-0″ projection.



END BENT

STRANDS AT GIRDER ENDS



WELDED WIRE PLACEMENT

S = Vertical wire spacing

L = Length of WWR mats

J = Distance between WWR mats

Bill of Reinforcing Steel

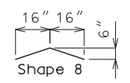
Bars Each Girder

No.	Size/Mark	Length	Shape
105	3 G1	2′-10″	8
2	4 G3	5′-5″	20
14	4 G6	Varies	20

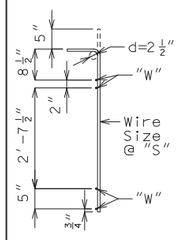
Welded Wire Each Girder

Mark	Size	S	W	L	J
WWR1	D31	4″	W12	4′-4″	8″
WWR2	D31	8″	W12	22′-8″	12″
WWR3	D31	12″	W12	23′-0″	–
WWR6	D31	2″	W12	16″	2¾″

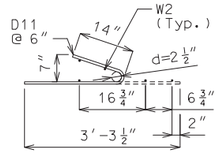
Bending Diagrams



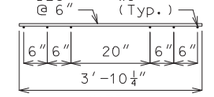
Shape 20



WWR1, WWR2, WWR3 & WWR6



WWR4



WWR5

All dimensions are out to out.

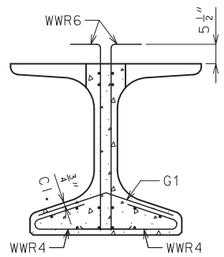
Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1″, unless otherwise shown.

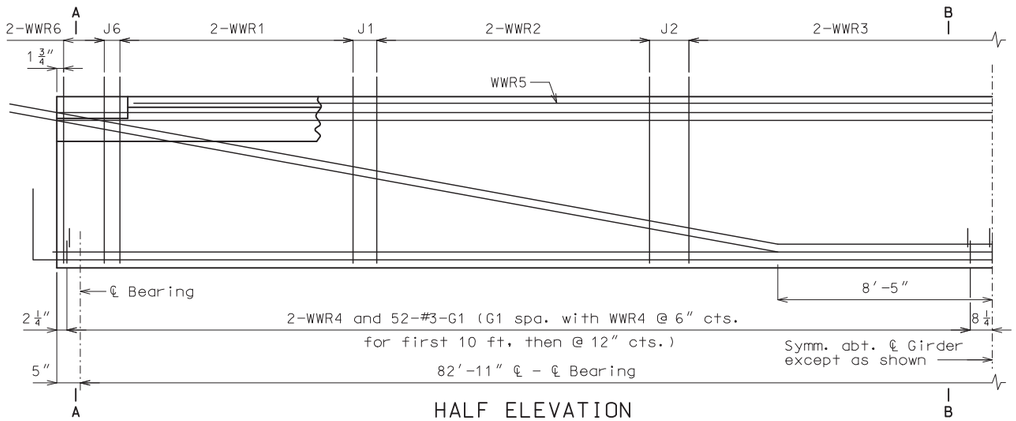
All bar reinforcement shall be Grade 60.

WWR shall not be epoxy coated.



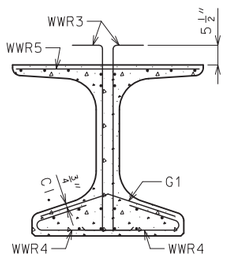
SECTION A-A

Strands not shown for clarity.



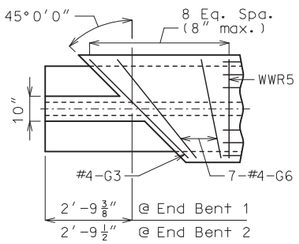
HALF ELEVATION

Reinforcement support strands not shown for clarity.

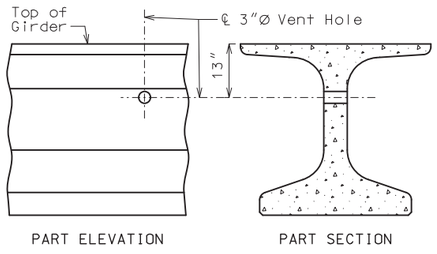


SECTION B-B

Strands not shown for clarity.



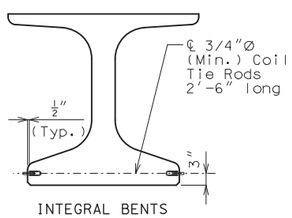
TOP FLANGE BLOCKOUT



PART ELEVATION PART SECTION

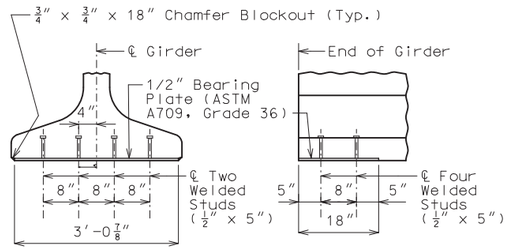
VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum.



INTEGRAL BENTS

COIL TIES



END VIEW SIDE VIEW

BEARING PLATE

NU-GIRDERS - SPAN (1-2)

General Notes:

Concrete for prestressed beams shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

Use 30 strands, 0.6″Ø Grade 270, with an initial prestress force of 1318 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

For Girder Camber Diagram, see Sheet No. 14.

For location of coil inserts at slab drains, see Sheet No. 13.

For location of coil ties at integral bents see Sheets No. 4 and 8.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE 67 | STATE MO

DISTRICT BR | SHEET NO. 10

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9278

DESCRIPTION | DATE | REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

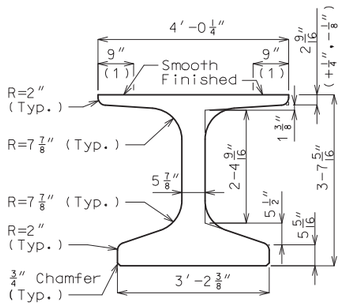
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

Skew Angle

CMT

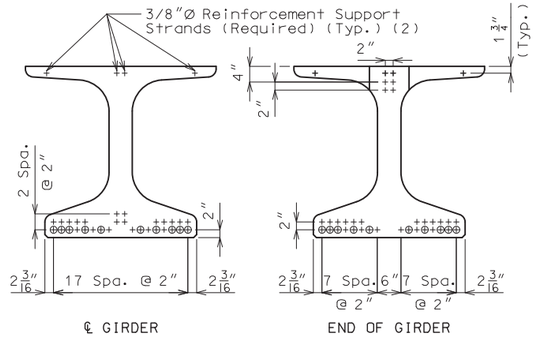
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



DIMENSIONS

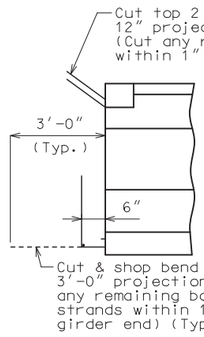
(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about ℄ Girder. May be moved laterally in pairs.



STRAND ARRANGEMENT

+ Indicates prestressing strand.

o Indicates cut & shop bend with 3′-0″ projection.

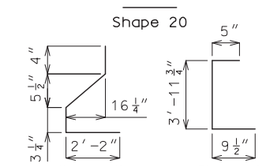


STRANDS AT GIRDER ENDS

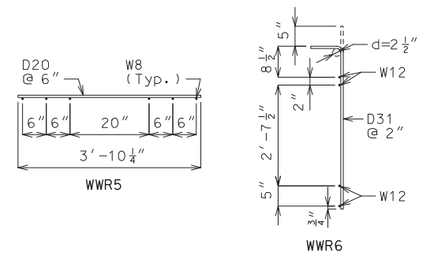
Bill of Reinforcing Steel - Each Girder

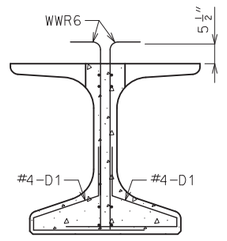
No.	Size/ Mark	Length	Shape
216	5 B1	5′-0″	11
236	4 D1	4′-0″	9
2	4 G3	5′-5″	20
14	4 G6	Varies	20

Bending Diagrams



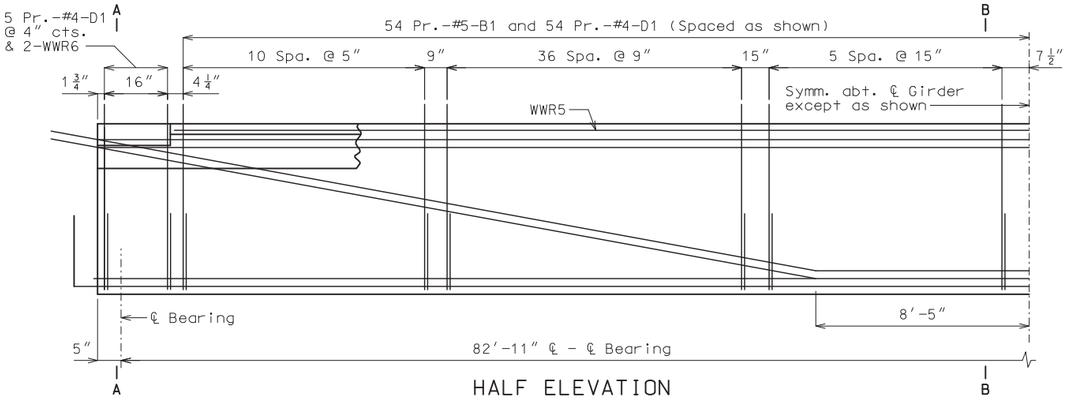
Welded Wire Reinforcement - Each Girder





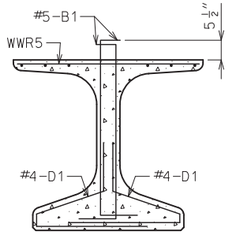
SECTION A-A

Strands not shown for clarity.



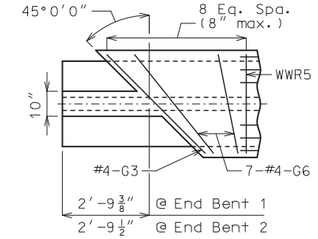
HALF ELEVATION

Reinforcement support strands not shown for clarity.

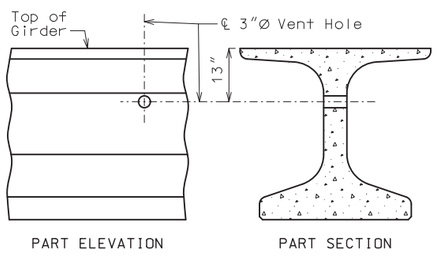


SECTION B-B

Strands not shown for clarity.

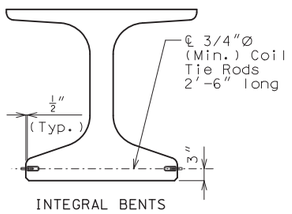


TOP FLANGE BLOCKOUT

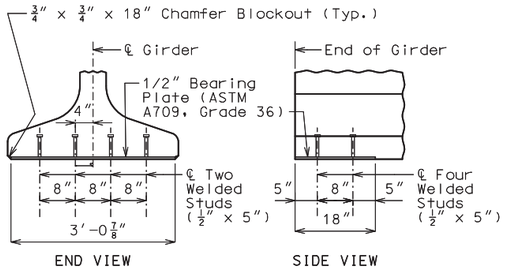


VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum.



COIL TIES



BEARING PLATE

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1″.

All bar reinforcement shall be Grade 60.

The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 bars shall be epoxy coated.

General Notes:

Concrete for prestressed girders shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

Use 30 strands, 0.6″Ø Grade 270, with an initial prestress force of 1318 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

For Girder Camber Diagram, see Sheet No. 14.

For location of coil inserts at slab drains, see Sheet No. 13.

For location of coil ties at integral bent, see Sheets No. 4 and 8.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

NU-GIRDERS (ALTERNATE REINFORCEMENT) - SPAN (1-2)

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	11

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9278

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

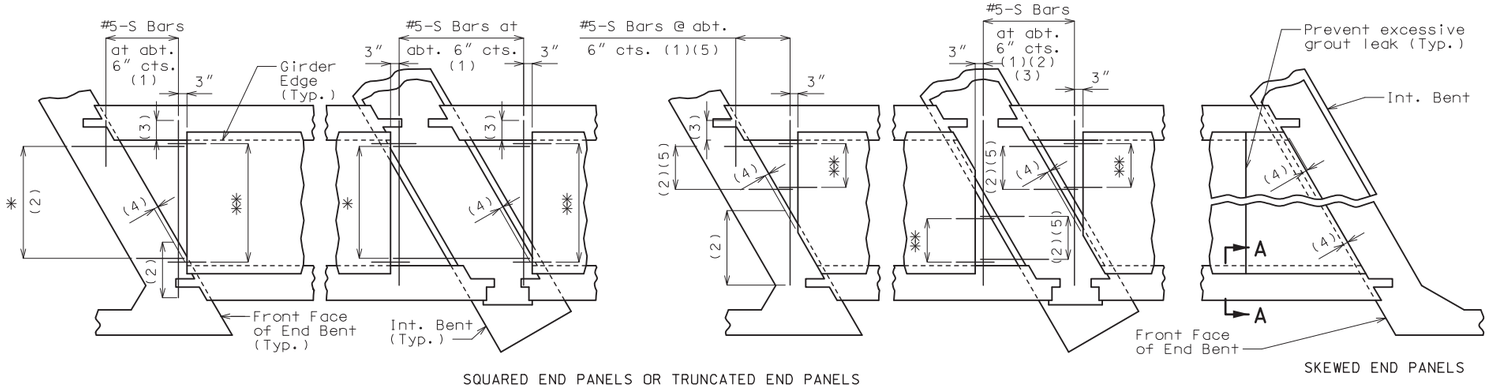
CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

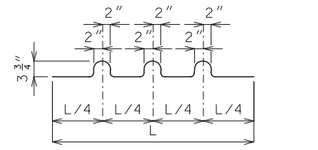
REV.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_011_J9P3751_NU_Girder_(Bar).dgn 8:58:08 AM 3/3/2023



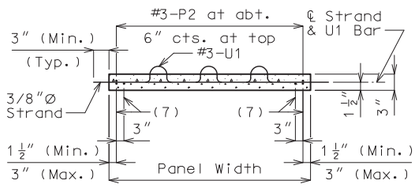
PLAN SHOWING PANELS PLACEMENT

* #5-S Bars at abt. 9" cts. (1)
** #3-P1 at 12" cts. (End panels only)

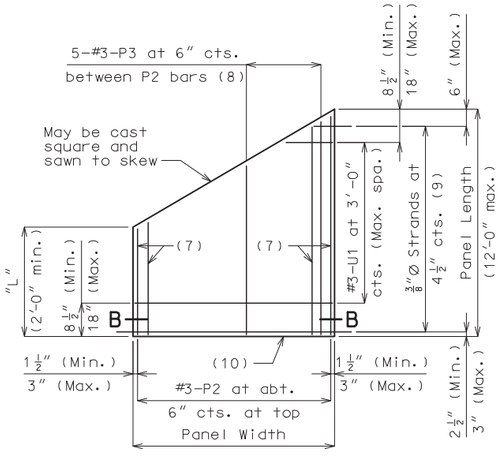


BENDING DIAGRAM FOR U1 BAR

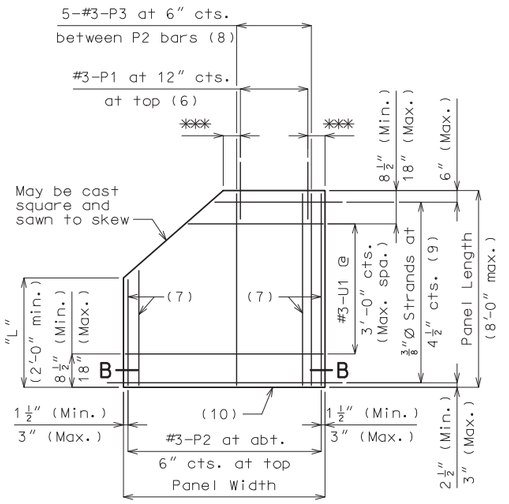
U1 Bars may be oriented at right angles to location and spacing shown. U1 Bars shall be placed between P1 bars.



SECTION B-B

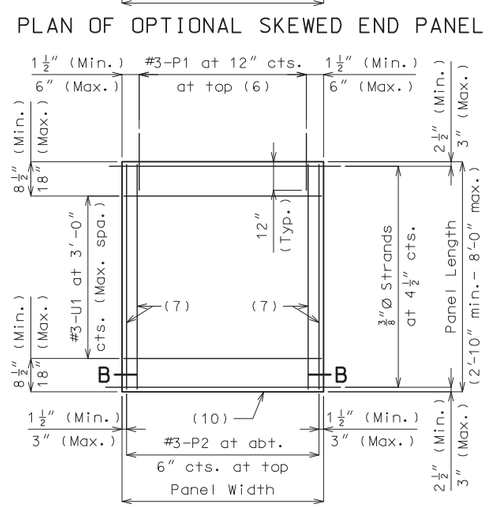


PLAN OF OPTIONAL SKEWED END PANEL

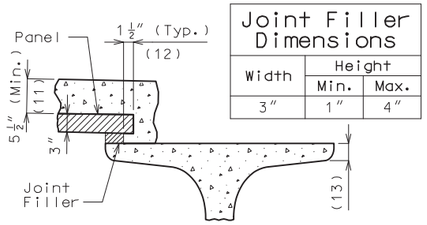


PLAN OF OPTIONAL TRUNCATED END PANEL

*** 3" (Min.), 6" (Max.)



PLAN OF SQUARED PANEL



SECTION A-A

Joint Filler Dimensions		
Width	Height	
	Min.	Max.
3"	1"	4"

Reference Notes:

Plan of Panels Placement:

(1) S-bars shown are bottom steel in slab between panels and used with squared and truncated end panels only.

(2) Extend S-bars 18 inches beyond the front face of end bents and int. bents for squared and truncated end panels only.

(3) Extend S-bars 9 inches beyond edge of girder (Typ.).

(4) End panels shall be dimensioned 1/2" min. to 1 1/2" max. from the inside face of diaphragm.

(5) For truncated end panels, use a min. of #5-S bars at 6" crossings in openings, or min. 4x4-W7xW7.

Plans of Panels:

(6) For end panels only, P1 bars shall be 2'-0" in length and embedded 12". P1 bars will not be required for panels at squared integral end bents.

(7) #3-P2 bars near edge of panel at bottom (under strands).

(8) Use #3-P3 bars if panel is skewed 45° or greater.

(9) Any strand 2'-0" or shorter shall have a #4 reinforcing bar on each side of it, centered between strands. Strands 2'-0" or shorter may then be debonded at the fabricator's option.

(10) Optional 1/2" x 45° Chamfer one or both sides at bottom.

Section A-A:

(11) Slab thickness over prestressed panels varies due to girder camber. In order to maintain minimum slab thickness, it may be necessary to raise the grade uniformly throughout the structure. No payment will be made for additional labor or materials required for necessary grade adjustment.

(12) Contractor shall ensure proper consolidation under and between panels.

(13) At the contractor's option, the variation in slab thickness over prestressed panels may be eliminated or reduced by increasing and varying the girder top flange thickness. Dimensions shall be shown on the shop drawings.

General Notes:

Prestressed Panels:

Concrete for prestressed panels shall be Class A-1 with f'c = 6,000 psi, f'ci = 4,000 psi.

The top surface of all panels shall receive a scored finish with a depth of scoring of 1/8" perpendicular to the prestressing strands in the panels.

Prestressing tendons shall be high-tensile strength, uncoated, seven-wire, low-relaxation strands for prestressed concrete in accordance with AASHTO M 203 Grade 270, with nominal diameter of strand = 3/8" and nominal area = 0.085 sq.in. and minimum ultimate strength = 22.95 kips (270 ksi). Larger strands may be used with the same spacing and initial tension.

Initial prestressing force = 17.2 kips/strand.

The method and sequence of releasing the strands shall be shown on the shop drawings.

Suitable anchorage devices for lifting panels may be cast in panels, provided the devices are shown on the shop drawings and approved by the engineer. Panel lengths shall be determined by the contractor and shown on the shop drawings.

When squared end panels are used at skewed bents, the skewed portion shall be cast full depth. No separate payment will be made for additional concrete and reinforcing required.

Support from diaphragm forms is required under the optional skewed end until cast-in-place concrete has reached 3,000 psi compressive strength.

Prestressed panels shall be brought to saturated surface-dry (SSD) condition just prior to the deck pour. There shall be no free standing water on the panels or in the area to be cast.

The prestressed panel quantities are not included in the table of estimated quantities for the slab.

Reinforcing Steel:

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

If U1 bars interfere with placement of slab steel, U1 loops may be bent over, as necessary, to clear slab steel.

Deformed welded wire reinforcement (WWR) providing a minimum area of reinforcing perpendicular to strands of 0.22 sq in./ft, with spacing parallel to strands sufficient to ensure proper handling, may be used in lieu of the #3-P2 bars shown. Wire diameter shall not be larger than 0.375 inch. The above alternative reinforcement criteria may be used in lieu of the #3-P3 bars, when required, and placed over a width not less than 2 feet.

The following reinforcing steel shall be tied securely to the strands with the following maximum spacing in each direction:
#3-P2 bars at 16 inches.
WWR at 24 inches.

The #3-U1 bars shall be tied securely to #3-P2 bars, to WWR or to strands (when placed between P1 bars) at about 3-foot centers.

Minimum reinforcement steel length shall be 2'-0".

All reinforcement other than prestressing strands shall be epoxy coated.

Precast panels may be in contact with stirrup reinforcing in diaphragms.

S-bars are not listed in the bill of reinforcing.

Cost of S-bars will be considered completely covered by the contract unit price for the slab.

Joint Filler:

Joint filler shall be preformed fiber expansion joint material in accordance with Sec 1057 or expanded or extruded polystyrene bedding material in accordance with Sec 1073.

Use Slab Haunching Diagram on Sheet No. 14 for determining thickness of joint filler within the limits noted in the table of Joint Filler Dimensions.

Thicker material may be used on one or both sides of the girder to reduce cast-in-place concrete thickness to within tolerances.

The same thickness of preformed fiber expansion joint material shall be used under any one edge of any panel except at locations where top flange thickness may be stepped. The maximum change in thickness between adjacent panels shall be 1/4 inch. The polystyrene bedding material may be cut with a transition to match haunch height above top of flange.

Joint filler shall be glued to the girder. When thickness exceeds 1 1/2 inches, the joint filler shall be glued top and bottom. The glue used shall be the type recommended by the joint filler manufacturer.

Edges of panels shall be uniformly seated on the joint filler before slab reinforcement is placed.

DETAILS OF PRESTRESSED PANELS

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED	
3/3/2023	
ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	12
COUNTY	
BUTLER	
JOB NO.	
J9P3751	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO.	
A9278	

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

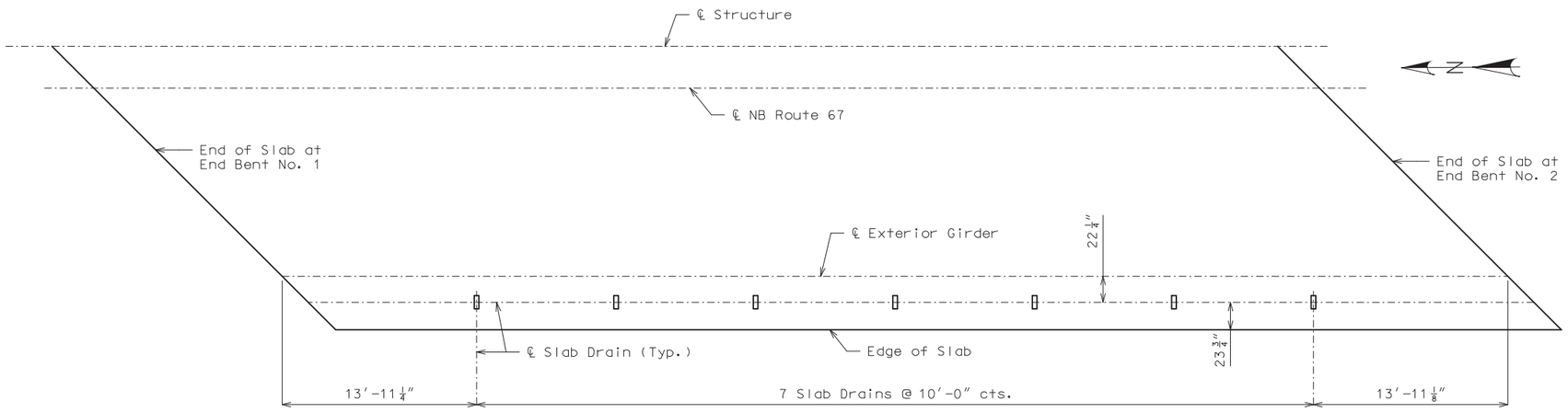
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

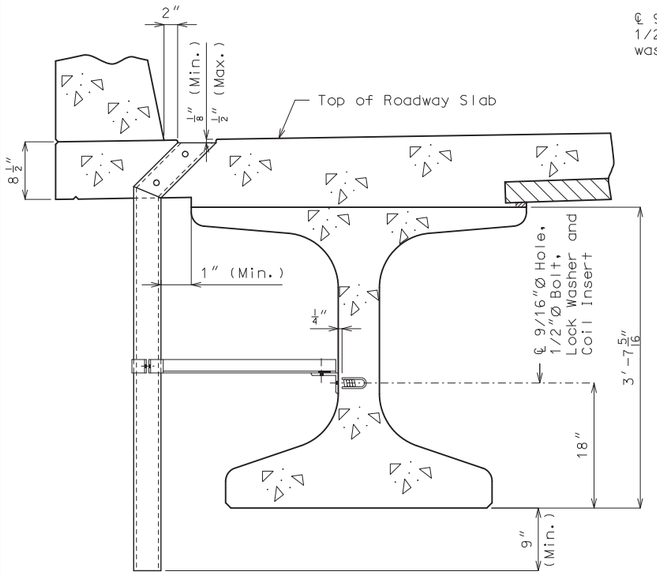
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_012_J9P3751_Precast_Prestressed_Panels.dgn 8:58:10 AM 3/3/2023



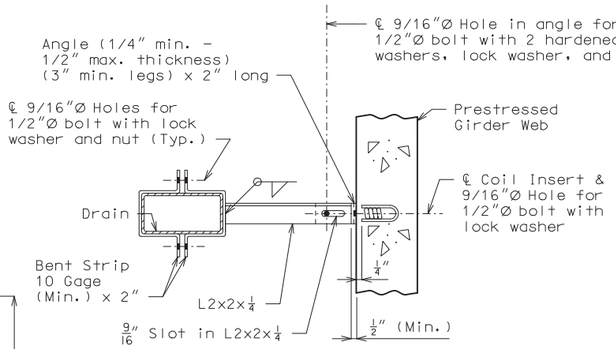
PART PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS

(Right side shown, left side similar)

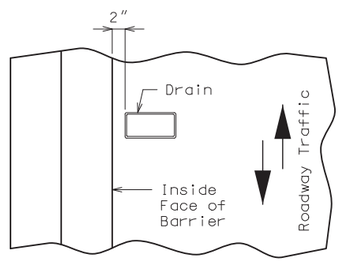
Note: Longitudinal dimensions are horizontal.



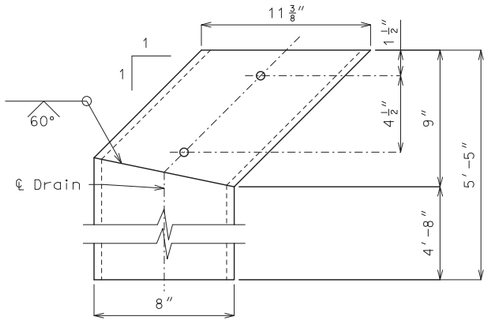
PART SECTION NEAR DRAIN



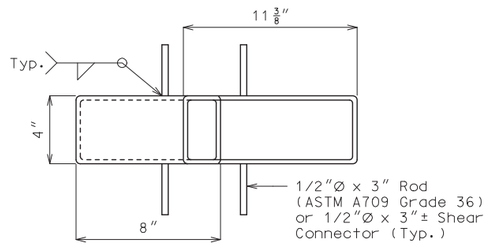
PART SECTION SHOWING BRACKET ASSEMBLY



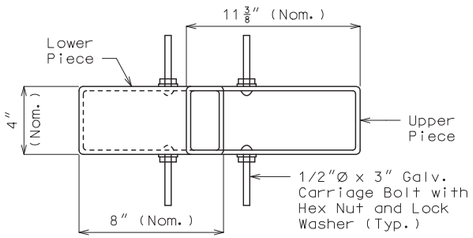
PART PLAN OF SLAB AT DRAIN



ELEVATION OF DRAIN



PLAN OF STEEL DRAIN OPTION



PLAN OF FRP DRAIN OPTION

SLAB DRAINS

General Notes:

Contractor shall have the option to construct either steel or FRP slab drains. All drains shall be of same type.

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Locate drains in slab by dimensions shown in Part Section Near Drain.

Reinforcing steel shall be shifted to clear drains.

The coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

All 1/2"Ø bolts shall be ASTM A307.

Shop drawings will not be required for the slab drains and the bracket assembly.

The coil insert required for the bracket assembly attachment shall be located on the prestressed girder shop drawings.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed girder fabricator.

Notes for Steel Drain:

Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Outside dimensions of drains are 8" x 4".

The drains shall be galvanized in accordance with ASTM A123.

Notes for FRP Drain:

Drains shall be machine filament-wound thermosetting resin tubing meeting the requirements of ASTM D2996 with the following exceptions:

Shape of drains shall be rectangular with outside nominal dimensions of 8" x 4".

Minimum reinforced wall thickness shall be 1/4 inch.

The resin used shall be ultraviolet (UV) resistant and/or have UV inhibitors mixed throughout. Drains may have an exterior coating for additional UV resistance.

The color of the slab drain shall be gray (Federal Standard 26373). The color shall be uniform throughout the resin and any coating used.

The combination of materials used in the manufacture of the drains shall be tested for UV resistance in accordance with ASTM D4329 Cycle A. The representative material shall withstand at least 500 hours of testing with only minor discoloration and without any physical deterioration. The contractor shall furnish the results of the required ultraviolet testing prior to acceptance of the slab drains.

At the contractor's option, drains may be field cut. The method of cutting FRP slab drain shall be as recommended by the manufacturer to ensure a smooth, chip free cut.

Both upper and lower drain pieces shall be rigidly connected to each other. Drain flow shall not be obstructed. Approval of the engineer is required.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	13

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9278

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

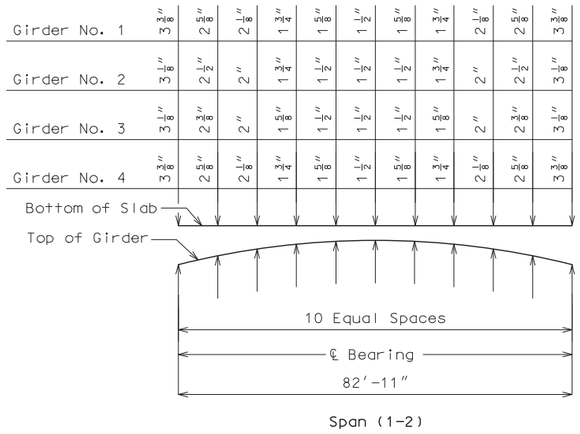
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_013_J9P3751_Slab_Drain.dgn 8:58:11 AM 3/3/2023



Span (1-2)

THEORETICAL SLAB HAUNCHING DIAGRAM

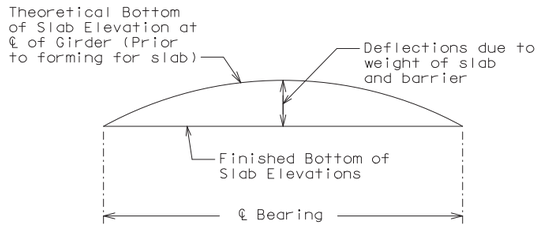
If girder camber is different from that shown in the camber diagram, in order to maintain minimum slab thickness, an adjustment of the slab haunches, an increase in slab thickness or a raise in grade uniformly throughout the structure shall be necessary. No payment will be made for additional labor or materials required for variation in haunching, slab thickness or grade adjustment.

Concrete in the slab haunches is included in the Estimated Quantities for Slab on Concrete NU-Girder.

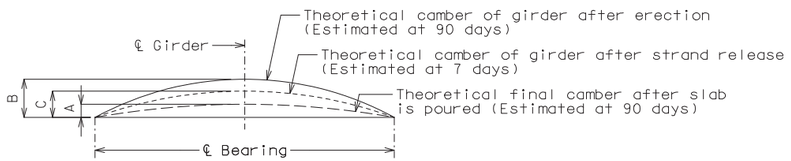
Theoretical Bottom of Slab Elevations at Centerline of Girder (Prior to forming for slab) (Estimated at 90 days)

Girder Number	Span (1-2) (82′-11″ ℄ Brg. - ℄ Brg.)										
	℄ Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ Brg.
1	308.33	308.35	308.36	308.36	308.35	308.33	308.31	308.27	308.22	308.16	308.10
2	308.52	308.54	308.55	308.56	308.56	308.54	308.51	308.47	308.42	308.35	308.29
3	308.61	308.63	308.64	308.65	308.65	308.63	308.60	308.56	308.50	308.44	308.38
4	308.36	308.37	308.38	308.39	308.38	308.36	308.33	308.29	308.24	308.19	308.13

Elevations are based on a constant slab thickness of 8 1/2″ and include allowance for theoretical dead load deflections due to weight of slab (including precast panel) and barrier.



TYPICAL SLAB ELEVATIONS DIAGRAM



Girder	Span (1-2)		
	A	B	C
Exterior	1 7/8″	3 1/4″	1 7/8″
Interior	1 5/8″		

GIRDER CAMBER DIAGRAM

Conversion factors for girder camber (Estimated at 90 days):

0.1 pt. = 0.314 x 0.5 pt.
0.2 pt. = 0.593 x 0.5 pt.
0.3 pt. = 0.813 x 0.5 pt.
0.4 pt. = 0.952 x 0.5 pt.

TBOS, HAUNCHING AND CAMBER

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_014_J9P3751_TBOS,_Haunching_and_Camber.dgn 8:58:12 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

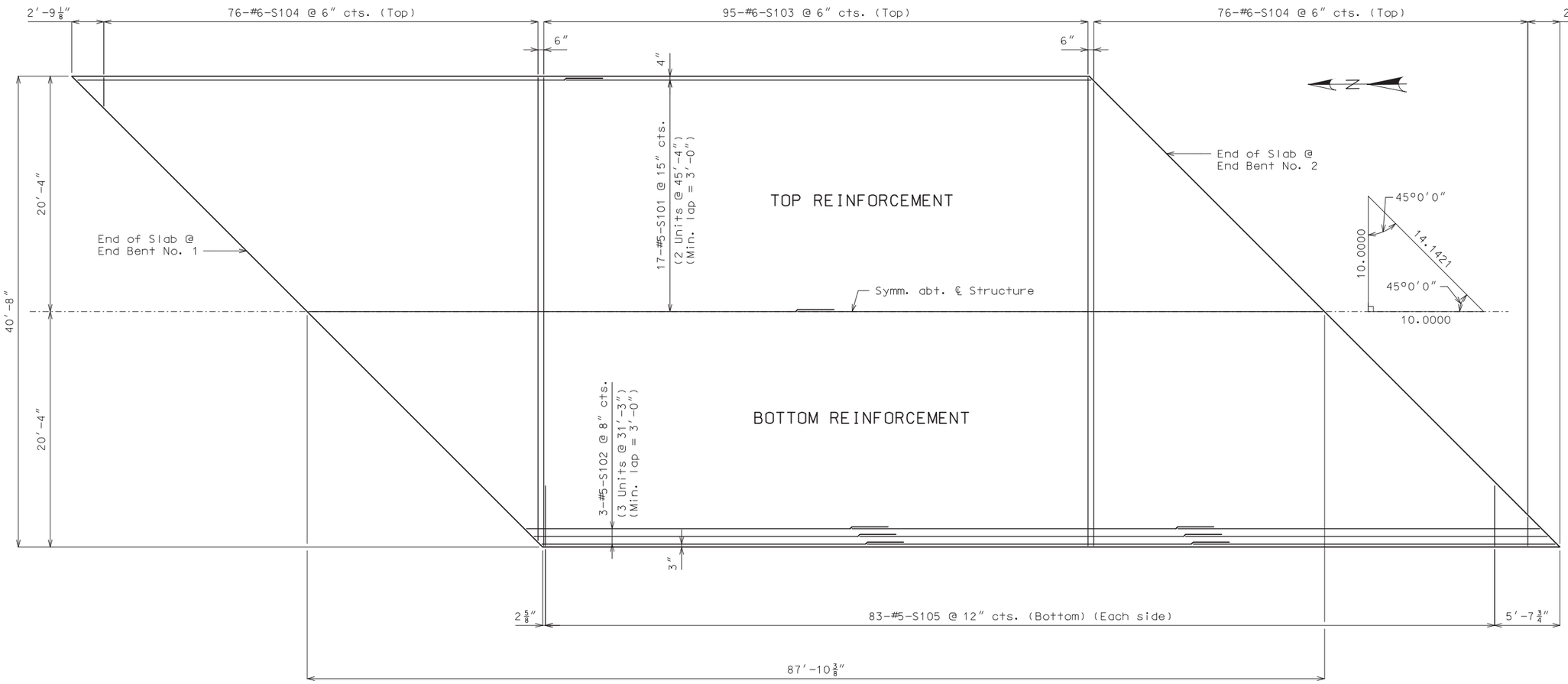
DATE PREPARED: 3/3/2023
ROUTE: 67 | STATE: MO
DISTRICT: BR | SHEET NO.: 14
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV. | DESCRIPTION | DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



PLAN OF SLAB SHOWING REINFORCEMENT

General Notes:

Longitudinal slab dimensions shown are horizontally.

For details of Precast Prestressed Panels, see Sheet No. 12.

For Theoretical Bottom of Slab Elevations, Girder Camber Diagram, and Theoretical Slab Haunching Diagram, see Sheet No. 14.

For Section Thru Slab, see Sheet No. 16.

For details and reinforcement of Type D Barrier not shown, see Sheets No. 17 and 18.

SLAB REINFORCEMENT DETAILS

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	15

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

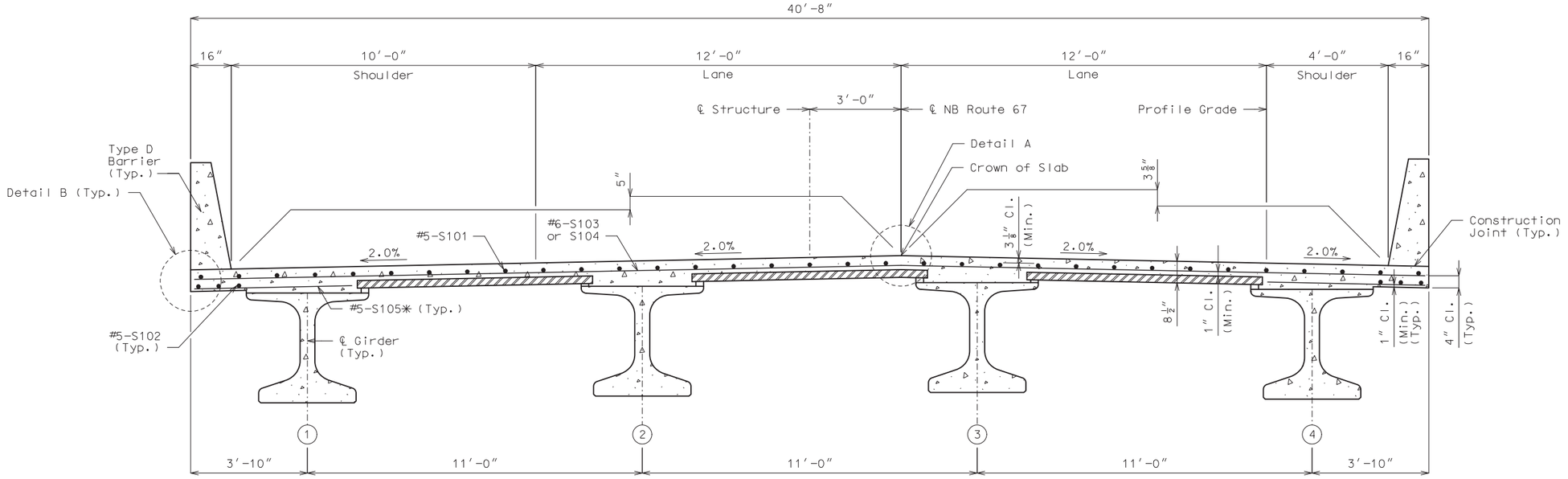
DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

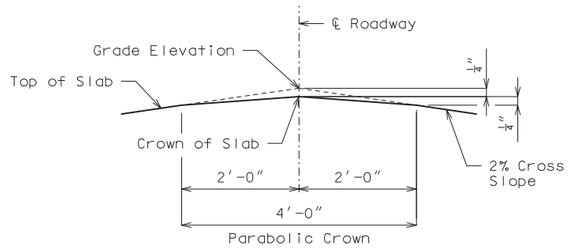
CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

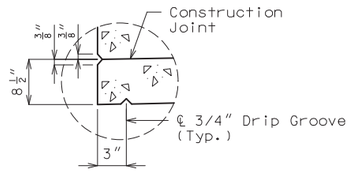


SECTION THRU SLAB

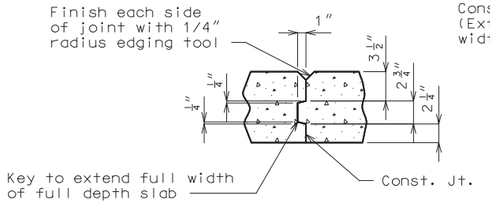
✳ Alternate bar shape available, see barrier sheets.



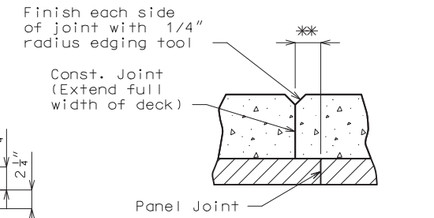
DETAIL A



DETAIL B



FULL DEPTH SLAB

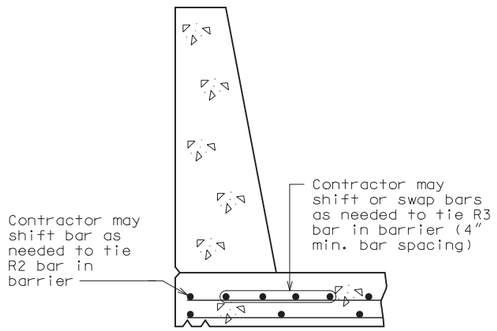


✳✳ Adjust the construction joint to a clearance of 6 inches minimum from the panel joint.

SLAB ON PANELS

SLAB CONSTRUCTION JOINT

(If needed)



OPTIONAL SHIFTING
TOP BARS AT BARRIER

General Notes:

For details and reinforcement of Type D Barrier not shown, see Sheets No. 17 & 18.

For details of Precast Prestressed Panels, see Sheet No. 12.

For Theoretical Bottom of Slab Elevations, Girder Camber Diagram and Theoretical Slab Haunching Diagram, see Sheet No. 14.

For Plan of Slab Showing Reinforcement, see Sheet No. 15.

The contractor shall pour and satisfactorily finish the roadway slab at a rate of not less than 25 cubic yards per hour.

The contractor shall furnish an approved retarder to retard the set of the concrete to 2.5 hours and shall pour and satisfactorily finish the slab pours at the rate given.

The concrete diaphragm at the integral end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

DETAILS OF SLAB REINFORCING

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_016_J9P3751_Section_thru_Slab.dgn 8:58:15 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	16

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9278

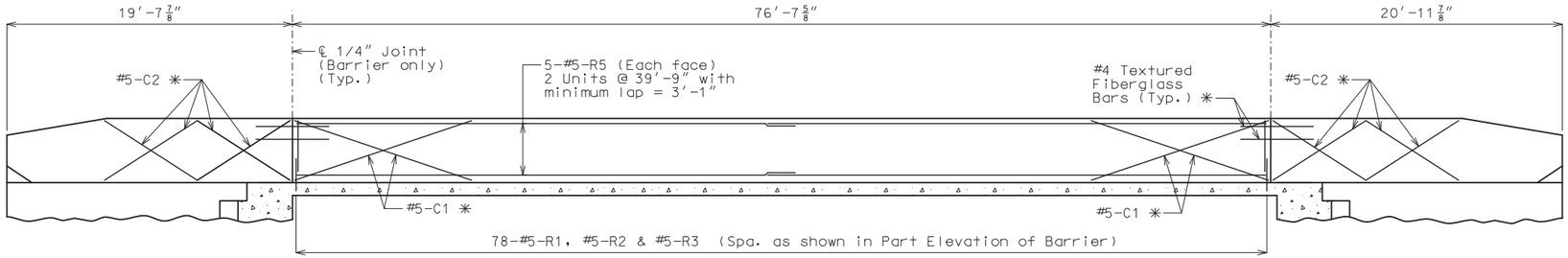
DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

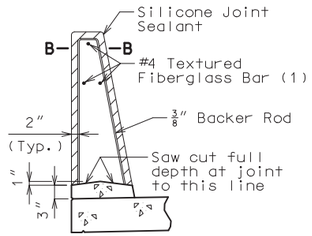
REV.



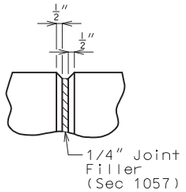
Span (1-2)

ELEVATION OF BARRIER

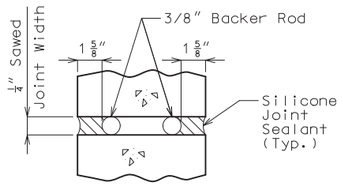
(Left barrier shown, right barrier similar by 180° rotation)
Longitudinal dimensions are horizontal.



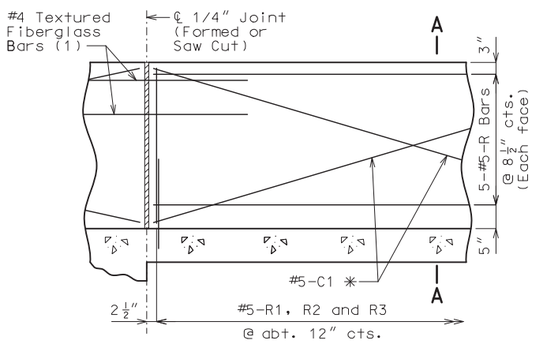
SECTION THRU SAW CUT JOINT



PART ELEVATION AT FORMED JOINT

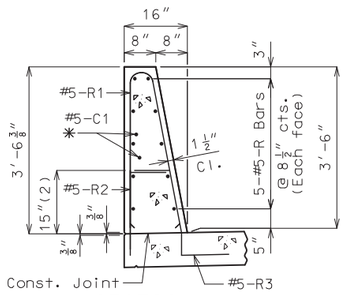


SECTION B-B



PART ELEVATION OF BARRIER

(1) Four feet long, centered on joint, slip-formed option only

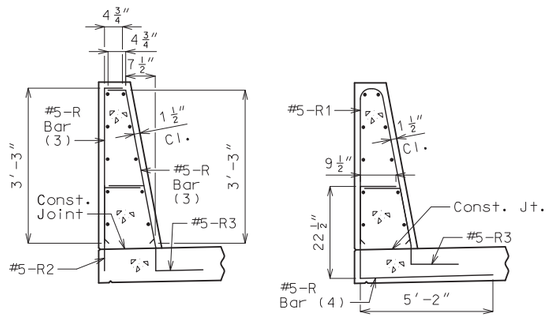


SECTION A-A

Use a minimum lap of 3′-1″ for #5 horizontal barrier bars.

The cross-sectional area above the slab is 3.52 square feet.

(2) To top of bar



R-BAR PERMISSIBLE ALTERNATE SHAPE

(3) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

(4) The R2 bar and #5 bottom transverse slab bar in cantilever (prestressed panels only) combination may be furnished as one bar as shown, at the contractor's option.

General Notes:

✳ Slip-formed option only.

Conventional forming or slip forming may be used. Saw cut joints may be used with conventional forming.

Top of barrier shall be built parallel to grade and barrier joints (except at end bents) normal to grade.

All exposed edges of barrier shall have either a 1/2-inch radius or a 3/8-inch bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for Type D Barrier per linear foot.

Concrete in barrier shall be Class B-1.

Measurement of barrier is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Type D Barrier.

Joint sealant and backer rods shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

For slip-formed option, both sides of barrier shall have a vertically broomed finish and the top shall have a transversely broomed finish.

TYPE D BARRIER

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_017_J9P3751_Barrier_Elevations.dgn 8:58:16 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	17

COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9278

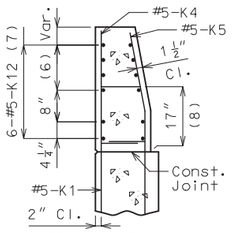
REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

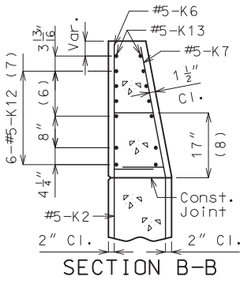
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

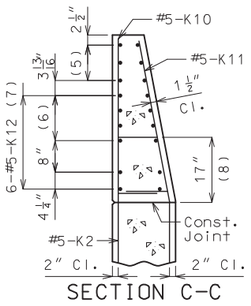
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



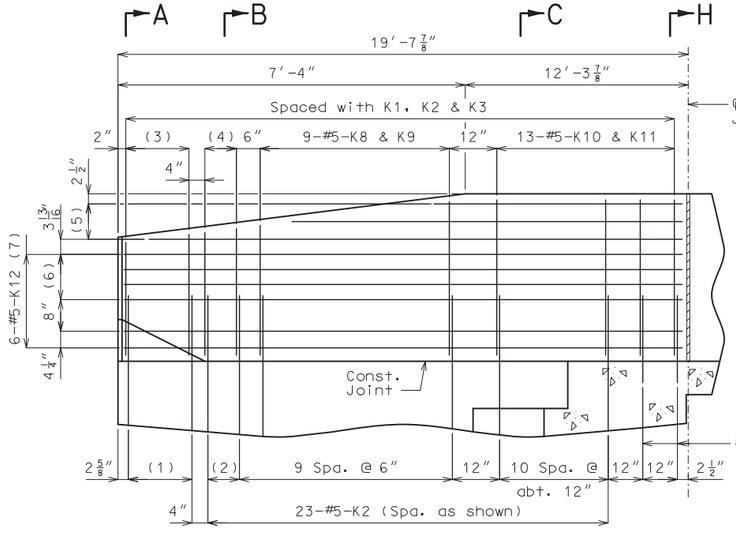
SECTION A-A



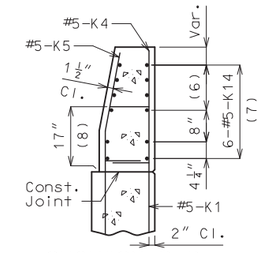
SECTION B-B



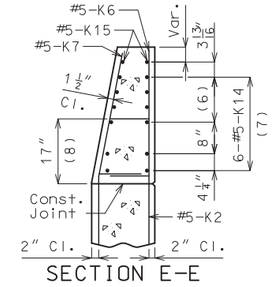
SECTION C-C



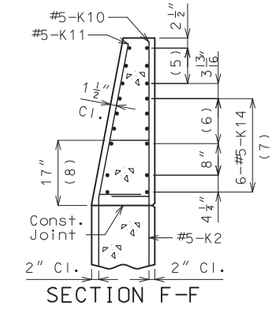
PART ELEVATION



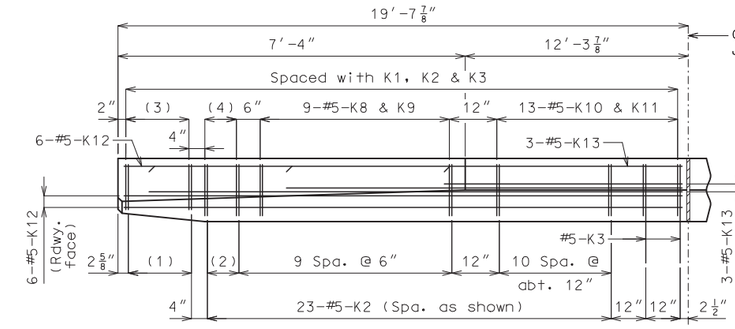
SECTION D-D



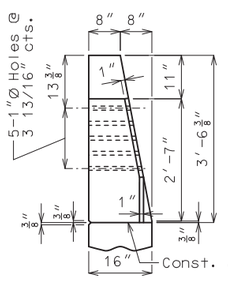
SECTION E-E



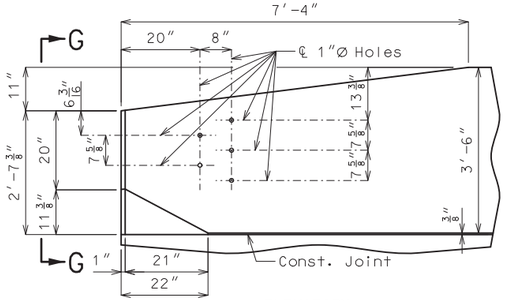
SECTION F-F



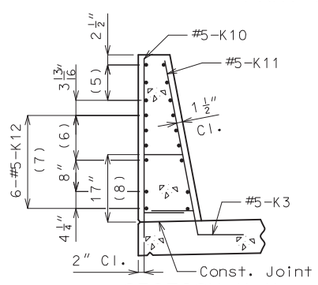
PART PLAN



ELEVATION G-G



ELEVATION



SECTION H-H

(1) 5-#5-K1 @ 4" cts.

(2) 2 spaces @ 4"

(3) 5-#5-K4 & K5

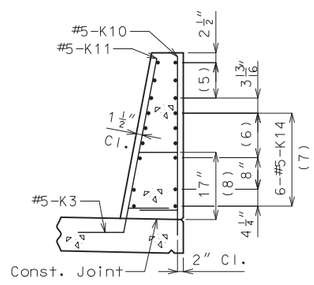
(4) 3-#5-K6 & K7

(5) 3-#5-K13 or K15 @ 4½" cts., each face

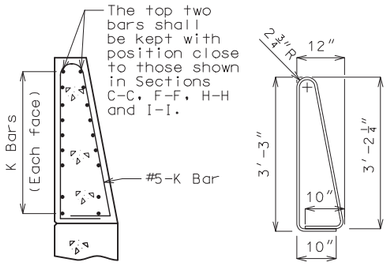
(6) 3 spaces @ 3 13/16"

(7) Spaced as shown, each face

(8) To top of bar



SECTION I-I

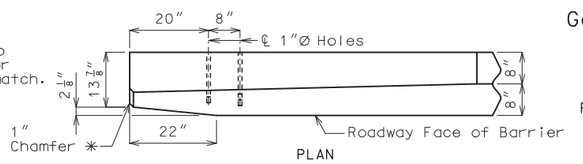


K10-K11 BAR PERMISSIBLE ALTERNATE SHAPE

(Other K bars not shown for clarity)

The K10-K11 bar combination may be furnished as one bar as shown, at the contractor's option.

All dimensions are out to out.



PLAN

✳ Transition to zero at Type A curb for gutter lines to match.

DETAILS OF GUARD RAIL ATTACHMENT

General Notes:

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Type D Barrier.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2" except as shown for bars embedded into end bent.

TYPE D BARRIER AT END BENTS

(Left barrier shown, right barrier similar by 180° rotation)

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 18 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED: 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	18

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9278

DESCRIPTION	DATE

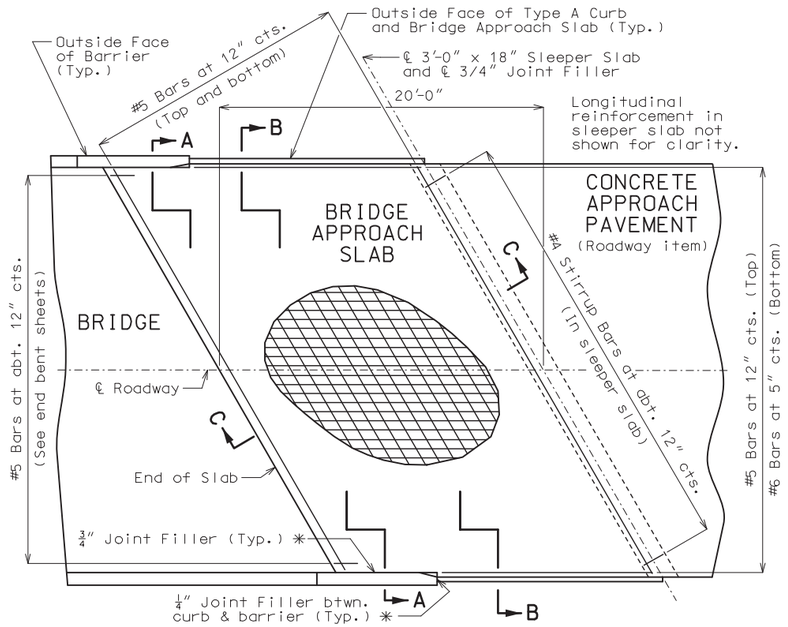
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

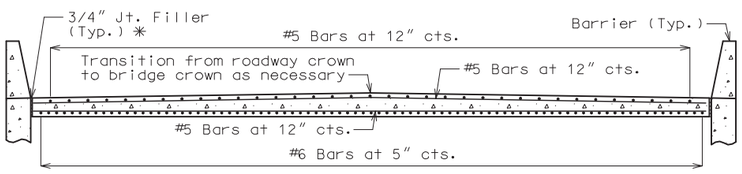
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

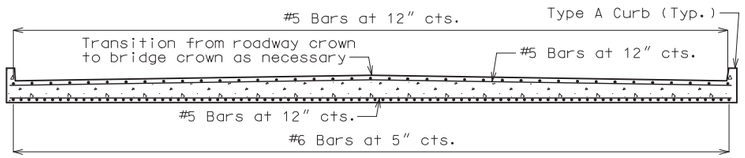
REV.



PART PLAN SHOWING REINFORCEMENT

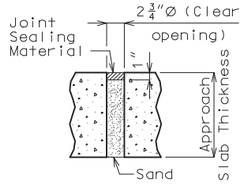


SECTION A-A



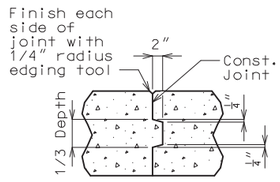
SECTION B-B

With the approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



UNDERSEAL ACCESS HOLE DETAIL

(If required)



CONSTRUCTION JOINT DETAIL

(If required)

General Notes:

All concrete for the bridge approach slab and sleeper slab shall be in accordance with Sec 503 (f'c = 4,000 psi).

The reinforcing steel in the bridge approach slab and the sleeper slab shall be epoxy coated Grade 60 with fy = 60,000 psi.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be continuous. The transverse reinforcing steel may be made continuous by providing a minimum lap splice of 29 inches for #5 bars and 44 inches for #6 bars, or by mechanical bar splice.

Mechanical bar splices shall be in accordance with Sec 710.

All joint filler shall be in accordance with Sec 1057 for preformed fiber expansion joint filler except as noted.

The contractor shall pour and satisfactorily finish the bridge slab before placing the bridge approach slab.

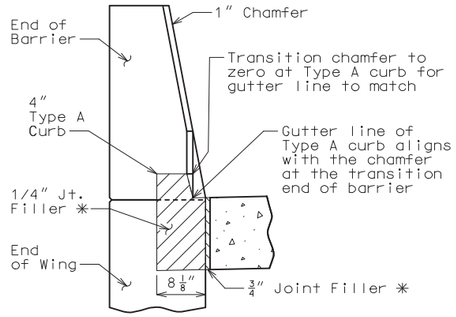
Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge slab.

For concrete approach pavement details, see roadway plans.

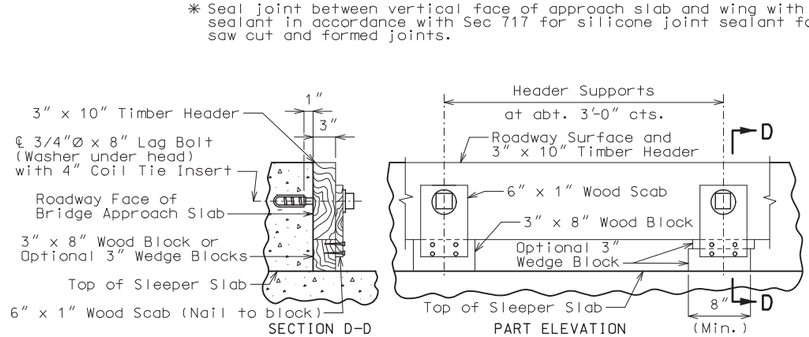
See Missouri Standard Plan 609.00 for details of Type A curb.

Payment for furnishing all materials, labor and excavation necessary to construct the approach slab, including the timber header, sleeper slab, underdrain, Type 5 aggregate base, joint filler and all other appurtenances and incidental work as shown on this sheet, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Major) per square yard.

✳ Seal joint between vertical face of approach slab and wing with sealant in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

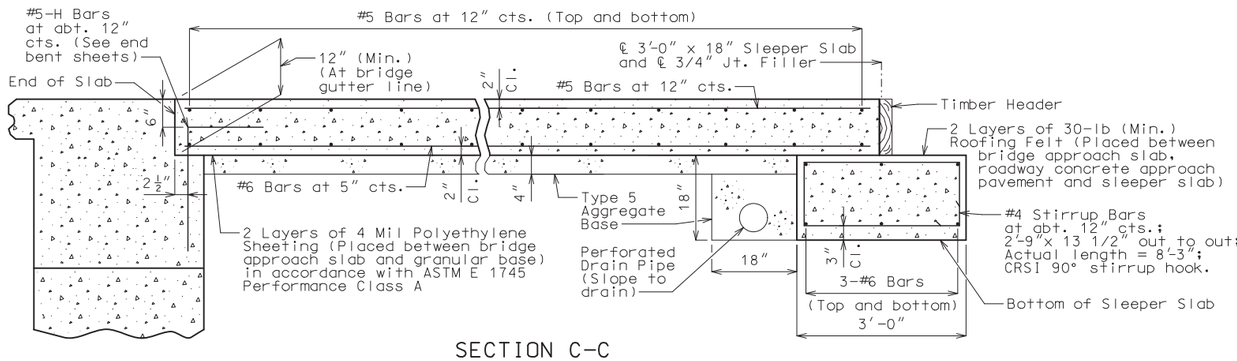


SECTION BETWEEN CURB AND BARRIER



DETAILS OF TIMBER HEADER

Remove timber header when concrete pavement is placed.



SECTION C-C

BRIDGE APPROACH SLAB (MAJOR)

JOSHUA D. JOLLIFF NUMBER PE-2006002824 STATE OF MISSOURI PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	19

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9278

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

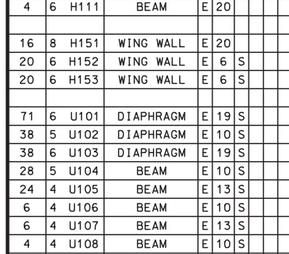
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9278\B_A9278_019_J9P3751_Approach_Slab.dgn 8:58:18 AM 3/3/2023

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			END BENT 1																									
10	6	F100	WING BRACE	E	23					2	3.000	4	6.750	14.000		13.000		5.250		2	1.000	10.250		8	0	7	9	117
10	6	F101	WING BRACE	E	15						14.000	9	6.000	2	3.000	10.250		2	1.000	13.000		5.250		12	11	12	10	193
4	6	F102	DIAPHRAGM	E	23					5	2.250	5	1.000							3	8.000	3	8.000	10	4	10	3	62
4	6	F103	DIAPHRAGM	E	21					8	7.500	5	1.000							6	1.250	6	1.250	13	9	13	6	82
38	5	H101	DIAPHRAGM	E	19					2	0.000		15.000											3	3	3	2	126
4	6	H102	DIAPHRAGM	E	20					57	1.000													57	1	57	1	343
4	8	H103	DIAPHRAGM	E	20					57	1.000													57	1	57	1	610
4	5	H104	DIAPHRAGM	E	23						15.250	3	3.000	15.250		10.750		10.750		10.750		10.750		5	10	5	9	24
9	6	H105	DIAPHRAGM	E	20					14	0.000													14	0	14	0	190
3	6	H106	DIAPHRAGM	E	20					10	8.000													10	8	10	8	49
6	6	H107	DIAPHRAGM	E	20					4	5.000													4	5	4	5	40
2	6	H108	DIAPHRAGM	E	20					2	9.000													2	9	2	9	9
8	8	H109	BEAM	E	20					57	1.000													57	1	57	1	1220
4	6	H110	BEAM	E	20					57	1.000													57	1	57	1	343
4	6	H111	BEAM	E	20					9	3.000													9	3	9	3	56
16	8	H151	WING WALL	E	20					16	6.000													16	6	16	6	705
20	6	H152	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
20	6	H153	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
71	6	U101	DIAPHRAGM	E	19	S				3	4.000	7	0.000											10	4	10	3	1094
38	5	U102	DIAPHRAGM	E	10	S						4	1.500	4	7.000									12	10	12	8	503
38	6	U103	DIAPHRAGM	E	19	S				3	0.000	5	3.000											8	3	8	2	467
28	5	U104	BEAM	E	10	S						6	3.250	5	3.000									17	10	17	7	514
24	4	U105	BEAM	E	13	S				5	3.000	2	8.000	5	3.000	2	8.000							16	7	16	4	262
6	4	U106	BEAM	E	10	S						2	8.000	5	3.000									10	7	10	5	42
6	4	U107	BEAM	E	13	S				5	3.000	2	11.000	5	3.000	2	11.000							17	1	16	10	68
4	4	U108	BEAM	E	10	S						2	11.000	5	3.000									11	1	10	11	30
28	6	V101	DIAPHRAGM	E	20					3	0.000													3	0	3	0	127
20	5	V102	BEAM	E	20					6	3.000													6	3	6	3	131
30	6	V151	WING WALL	E	20					7	2.000													7	2	7	2	323
30	6	V152	WING WALL	E	20					7	2.000													7	2	7	2	323
			END BENT 2																									
10	6	F200	WING BRACE	E	23					2	3.000	4	6.750	14.000		13.000		5.250		2	1.000	10.250		8	0	7	9	117
10	6	F201	WING BRACE	E	15						14.000	9	6.000	2	3.000	10.250		2	1.000	13.000		5.250		12	11	12	10	193
4	6	F202	DIAPHRAGM	E	23					5	2.250	5	1.000							3	8.000	3	8.000	10	4	10	3	62
4	6	F203	DIAPHRAGM	E	21					8	7.500	5	1.000							6	1.250	6	1.250	13	9	13	6	82
38	5	H201	DIAPHRAGM	E	19					2	0.000		15.000											3	3	3	2	126
4	6	H202	DIAPHRAGM	E	20					57	1.000													57	1	57	1	343
4	8	H203	DIAPHRAGM	E	20					57	1.000													57	1	57	1	610
4	5	H204	DIAPHRAGM	E	23						15.250	3	3.000	15.250		10.750		10.750		10.750		10.750		5	10	5	9	24
9	6	H205	DIAPHRAGM	E	20					14	0.000													14	0	14	0	190
3	6	H206	DIAPHRAGM	E	20					10	8.000													10	8	10	8	49
6	6	H207	DIAPHRAGM	E	20					4	5.000													4	5	4	5	40
2	6	H208	DIAPHRAGM	E	20					2	9.000													2	9	2	9	9
8	8	H209	BEAM	E	20					57	1.000													57	1	57	1	1220
4	6	H210	BEAM	E	20					57	1.000													57	1	57	1	343
4	6	H211	BEAM	E	20					9	3.000													9	3	9	3	56

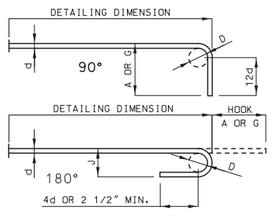
BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
16	8	H251	WING WALL	E	20					16	6.000													16	6	16	6	705
20	6	H252	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
20	6	H253	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
71	6	U201	DIAPHRAGM	E	19	S				3	4.000	7	0.000											10	4	10	3	1094
38	5	U202	DIAPHRAGM	E	10	S						4	1.500	4	7.000									12	10	12	8	503
38	6	U203	DIAPHRAGM	E	19	S				3	0.000	5	3.000											8	3	8	2	467
28	5	U204	BEAM	E	10	S						6	3.000	5	3.000									17	9	17	7	514
24	4	U205	BEAM	E	13	S				5	3.000	2	8.000	5	3.000	2	8.000							16	7	16	4	262
6	4	U206	BEAM	E	10	S						2	8.000	5	3.000									10	7	10	5	42
6	4	U207	BEAM	E	13	S				5	3.000	2	11.000	5	3.000	2	11.000							17	1	16	10	68
4	4	U208	BEAM	E	10	S						2	11.000	5	3.000									11	1	10	11	30
28	6	V201	DIAPHRAGM	E	20					3	0.000													3	0	3	0	127
20	5	V202	BEAM	E	20					6	3.000													6	3	6	3	131
30	6	V251	WING WALL	E	20					7	1.000													7	1	7	1	320
30	6	V252	WING WALL	E	20					7	1.000													7	1	7	1	320
			SLAB																									
66	5	S101	SLAB	E	20					45	4.000													45	4	45	4	3121
18	5	S102	SLAB	E	20					31	3.000													31	3	31	3	587
95	6	S103	SLAB	E	20					40	5.000													40	5	40	5	5768
152	6	S104	SLAB	E	20			V	2	39	11.500													40	0	40	0	
			INCR. = 0.5′							2	5.500													2	6	2	6	4852
166	5	S105	SLAB	E	20					5	2.000													5	2	5	2	895
			TYPE D BARRIER																									
156	5	R1	BARRIER	E	26					3	3.000		5.500	3	0.750					3	3.000		6.750	6	11	6	8	1085
156	5	R2	BARRIER	E	19	S					20.500		9.500											2	6	2	5	394
156	5	R3	BARRIER	E	27	S							9.500	15.250		5.000		12.000		15.000		3.000		3	6	3	4	543
40	5	R5	BARRIER	E	20					39	9.000													39	9	39	9	1659
20	5	K1	BARRIER	E	27	S				3	8.000		9.250	5.250		3	2.750				5.250		1.000	8	2	8	0	167
94	5	K2	BARRIER	E	27	S				3	8.000		9.250	14.500		2	5.750				14.250		2.750	8	2	8	0	785
8	5	K3	BARRIER	E	27	S					22.500		9.250	14.750		7.750		12.000		14.500		2.750		5	7	5	3	44
20	5	K4	BARRIER	E	19	S	V	4		2	4.250		10.000											3	3	3	1	
			INCR. = 0.5″							2	6.250		10.000											3	5	3	3	67
20	5	K5	BARRIER	E	14	S	V	4			8.250		9.500	18.500							4.000		18.000	3	1	2	11	
			INCR. = 0.5″								8.250		9.500	20.500							4.500		20.000	3	3	3	1	63
12	5	K6	BARRIER	E	19	S	V	4	2		6.750		10.000											3	5	3	4	
			INCR. = 0.5″						2		7.750		10.000											3	6	3	5	43
12	5	K7	BARRIER	E	21	S	V	4	2		6.750		10.000									2	6.000	6.250	3	5	3	4	
			INCR. = 0.5″						2		7.750		10.000									2	7.000	6.500	3	6	3	5	43
36	5	K8	BARRIER	E	19	S	V	4	2		8.500		10.000											3	7	3	6	
			INCR. = 0.75′						3		2.500		10.000											4	1	4	0	141
36	5	K9	BARRIER	E	21	S	V	4	2		8.500		10.000									2	7.750	6.750	3	7	3	6	
			INCR. = 0.75′						3		2.500		10.000									3	1.750	7.750	4	1	4	0	141
54	5	K10	BARRIER	E	19	S				3	3.000		10.000											4	1	4	0	226
54	5	K11	BARRIER	E	21	S				3	3.000		10.000									3	2.250	7.750	4	1	4	0	226
24	5	K12	BARRIER	E	20					19	4.000													19	4	19	4	484
12	5	K13	BARRIER	E	20		V	4		18	7.000													18	7	18	7	
			INCR. = 3′							12	7.000													12	7	12	7	196
24	5	K14	BARRIER	E	20					20	8.000													20	8	20	8	518
12	5	K15	BARRIER	E	20		V	4		19	11.000													19	11	19	11	
			INCR. = 3′							13	11.000													13	11	13	11	212



STIRRUP HOOK DIMENSIONS					
GRADES 40 – 50 – 60 KSI					
BAR SIZE	D (IN.)	90° HOOK		135° HOOK	
		HOOK A OR G		HOOK A OR G	APPROX. H
#4	2″	4 1/2″		4 1/2″	3″
#5	2 1/2″	6″		5 1/2″	3 3/4″
#6	4 1/2″	12″		8″	4 1/2″

NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS		90° HOOKS
		A OR G	J	A OR G
#3	2 1/4″	5″	3″	6″
#4	3″	6″	4″	8″
#5	3 3/4″	7″	5″	10″
#6	4 1/2″	8″	6″	12″
#7	5 1/4″	10″	7″	14″
#8	6″	11″	8″	16″
#9	9 1/2″	15″	11 3/4″	19″
#10	10 3/4″	17″	13 1/4″	22″
#11	12″	19″	14 3/4″	2′-0″
#14	18 1/4″	2′-3″	21 3/4″	2′-7″

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.

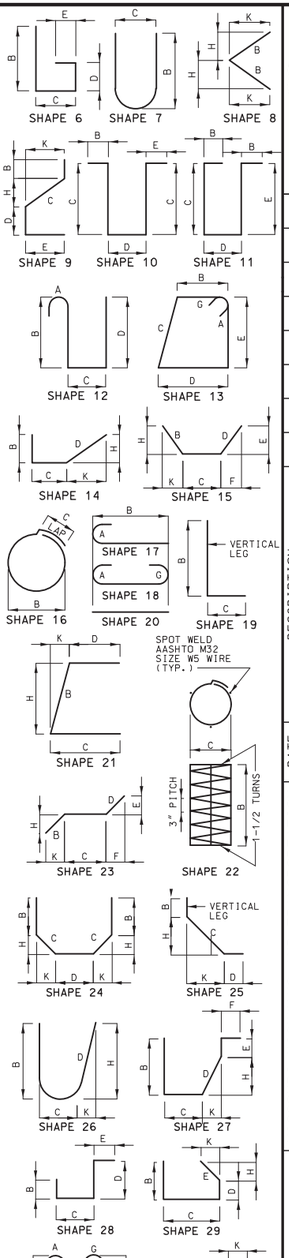
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.

REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.



BENDING DIAGRAMS

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	20

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

DATE	DESCRIPTION

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Detailed Oct. 2022
Checked Oct. 2022

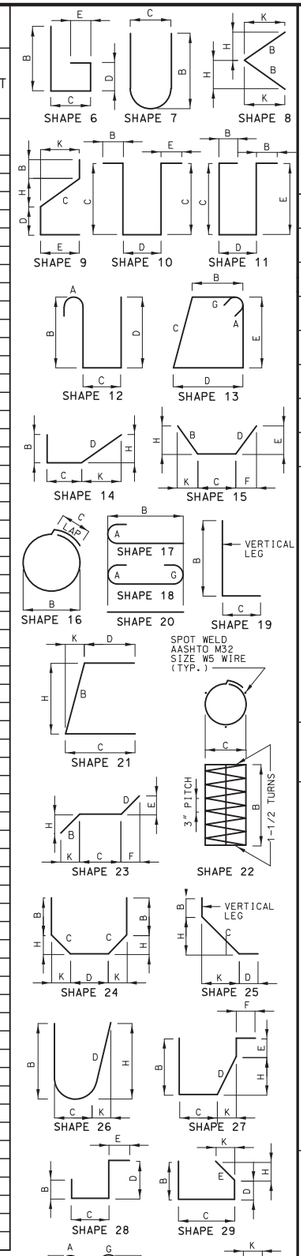
Note: This drawing is not to scale. Follow dimensions.

BILL OF REINFORCING STEEL

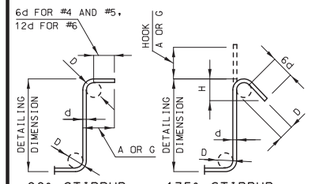
NO. REQ'D.	MARK NO. SIZE	MARK NO. MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
8	5	C1	SLIP FORM	E	20					12	0.000													12	0	12	0	101
16	5	C2	SLIP FORM	E	20					8	0.000													8	0	8	0	134
			TOTALS																									
	4			E																								804
	5			E																								14471
	6			E																								20246
	8			E																								5070
			TOTAL	E																								40591
			SLAB ON																									
			CONCRETE																									
			NU-GIRDER																									
	4			E																								804
	5			E																								7199
	6			E																								20246
	8			E																								5070
			TOTAL	E																								33319
			TYPE D																									
			BARRIER																									
	5			E																								7037
			TOTAL	E																								7037
			SLIP FORM OPTION																									
	5			E																								235
			TOTAL	E																								235

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK NO. MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.

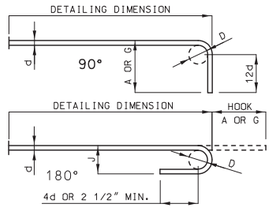


BENDING DIAGRAMS



STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK HOOK A OR G	135° HOOK HOOK A OR G	135° HOOK APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.

NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.

REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	21

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

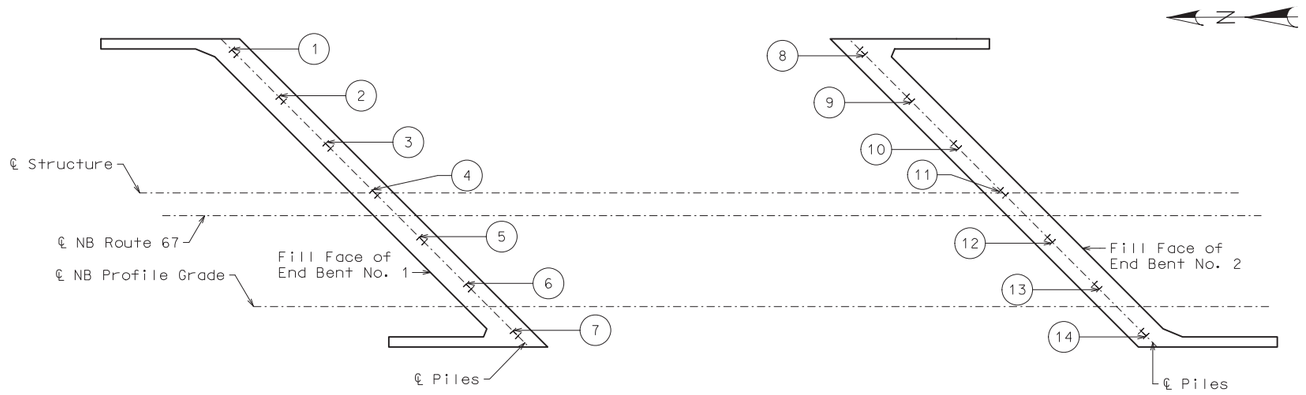
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.



PART PLAN SHOWING PILE NUMBERING FOR RECORDING AS-BUILT PILE DATA

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent No. 1
1			
2			
3			
4			
5			
6			
7			

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent No. 2
8			
9			
10			
11			
12			
13			
14			

Note:
Indicate in remarks column:
A. Pile type and grade
B. Batter
C. Driven to practical refusal

This sheet to be completed by MoDOT construction personnel.

AS-BUILT PILE DATA

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED: 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	22

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9278

REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-101

CLIENT MoDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri
DATE STARTED 12/3/21 **COMPLETED** 12/6/21
GROUND ELEVATION 305.2 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR Smith & Co. **DRILLED BY** Smith & Co
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger and Mud Rotary (CME-750)
AT TIME OF DRILLING ---
LOGGED BY NB **CHECKED BY** CM
AT END OF DRILLING ---
STATION 757+52 **OFFSET** 68' LT
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL - 2 inches										
		(SC) CLAYEY SAND: Brown, moist, medium dense	SPT SS1	56	1-2-3 (5)			14				53
			SPT SS2	78	6-10-13 (23)			12				48
			SPT SS3	94	5-8-9 (17)			11				47
10			SPT SS4	72	3-6-9 (15)			12				32
		(SP) GRAVELLY SAND: Gray, moist, loose	SPT SS5	72	4-4-2 (6)			32				25
20		(SP) SAND: Gray, moist, loose	SPT SS6	100	2-1-4 (5)			20				22
			SPT SS7	72	2-1-2 (3)			22				25
30			SPT SS8	56	5-9-7 (16)			21				27
			SPT SS9	67	4-6-13 (19)			22				26
40			SPT SS10	50	6-7-9 (16)			21				26
			SPT SS11	72	16-21-25 (46)			18				22
50		(SP) GRAVELLY SAND: Gray to brown, moist, medium dense to very dense	SPT SS12	33	7-7-7 (14)			18				43

(Continued Next Page)

GEOTECH BH COLUMNS - GINT STD US LAB 2021.GDT - 4/29/22 17:32 - C:\USERS\CMATHEWS\DESKTOP\US 67\20284 - MODOT US 67 BUTLER COUNTY.GPJ

B-101

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-101

CLIENT MoDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SP) GRAVELLY SAND: Gray to brown, moist, medium dense to very dense *(continued)*										
			SPT SS13	39	10-12-12 (24)			22				28
60			SPT SS14	44	11-15-14 (29)			17				27
			SPT SS15	61	10-12-15 (27)			15				25
70			SPT SS16	44	15-18-23 (41)			23				32
			SPT SS17	11	16-22-22 (44)							44
		Refusal at 79.8 feet. Bottom of borehole at 79.8 feet.	SPT SS18	83	50/4"			14				44

GEOTECH BH COLUMNS - GINT STD US LAB 2021.GDT - 4/29/22 17:32 - C:\USERS\CMATHEWS\DESKTOP\US 67\20284 - MODOT US 67 BUTLER COUNTY.GPJ

B-101

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 23
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9278

DESCRIPTION | DATE | REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-102

CLIENT McDOT **PROJECT NAME** Route 67 over Harviell Ditch
PROJECT NUMBER 20284 **PROJECT LOCATION** Butler County, Missouri
DATE STARTED 12/20/21 **COMPLETED** 12/21/21 **GROUND ELEVATION** 305.4 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR Smith & Co. **DRILLED BY** Smith & Co **GROUND WATER LEVELS:**
DRILLING METHOD Hollow Stem Auger and Mud Rotary (CME-750) ▽ **AT TIME OF DRILLING** 20.00 ft / Elev 285.40 ft
LOGGED BY NB **CHECKED BY** CM **AT END OF DRILLING** ---
STATION 758+98 **OFFSET** 46' LT **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL - 7 inches										
		(SC) CLAYEY SAND: Brown to graysih brown, moist, medium dense	SPT SS1	78	1-2-1 (3)			17				43
			SPT SS2	86	3-6-4 (10)			11				45
			SPT SS3	75	2-2-3 (5)			14				48
10		(SP-SC) SAND WITH CLAY: Pale brown to gray, moist, medium dense	SPT SS4	94	3-5-5 (10)			9				26
			SPT SS5	83	6-7-8 (15)			20				20
20	▽		SPT SS6	44	5-8-6 (14)			22				28
		(SP) SAND: Gray, moist, very loose to medium dense	SPT SS7	50	0-0-1 (1)			23				30
30			SPT SS8	50	4-1-2 (3)			22				31
			SPT SS9	72	5-6-7 (13)			22				23
40			SPT SS10	61	7-11-13 (24)			21				24
			SPT SS11	67	14-11-20 (31)			19				23
50		(SP) GRAVELLY SAND: Gray, moist, medium dense	SPT SS12	50	6-6-8 (14)			20				24

(Continued Next Page)

B-102

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-102

CLIENT McDOT **PROJECT NAME** Route 67 over Harviell Ditch
PROJECT NUMBER 20284 **PROJECT LOCATION** Butler County, Missouri

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SP) GRAVELLY SAND: Gray, moist, medium dense *(continued)*										
			SPT SS13	56	9-9-10 (19)			19				26
60			SPT SS14	61	6-9-12 (21)			20				25
			SPT SS15	56	6-9-10 (19)			19				31
70			SPT SS16	58	5-6-9 (15)			20				28
		(SP) GRAVELLY SAND WITH CLAY: Gray, moist, medium dense	SPT SS17	53	7-7-4 (11)			15				36
80		(SP) GRAVELLY SAND: Gray, moist, medium dense	SPT SS18	64	10-12-14 (26)			17				29

Refusal at 82.0 feet.
Bottom of borehole at 82.0 feet.

B-102

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 24 of 24

GEOTECH BH COLUMNS - GINT STD US LAB 2021.GDT - 4/29/22 17:32 - C:\USERS\CMATHEWS\DESKTOP\US 67\20284 - MODOT US 67 BUTLER COUNTY.GPJ

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 24
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9278

DATE	DESCRIPTION	REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

SEC./SUR. 28 TWP. 23N RGE. 5E

Notes:

Roadway fill shall be completed to the final roadway section and up to the elevation of the bottom of the concrete beam within the limits of the structure and for not less than 25 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

Hydrologic Data
Drainage Area = 9.3 mi^2
Design Flood Frequency = 50 years
Design Flood Discharge = 1,060 cfs
Design Flood (D.F.) Elevation = 302.9
Base Flood (100-year)
Base Flood Elevation = 303.4
Base Flood Discharge = 1,210 cfs
Estimated Backwater = 0.1 ft
Average Velocity thru Opening = 2.5 ft/s
Freeboard (50-year)
Freeboard = 1.3 ft
Roadway Overtopping
Overtopping Flood Discharge = N/A
Overtopping Flood Frequency = >500 years
500 Year Flood Elevation = 304.6

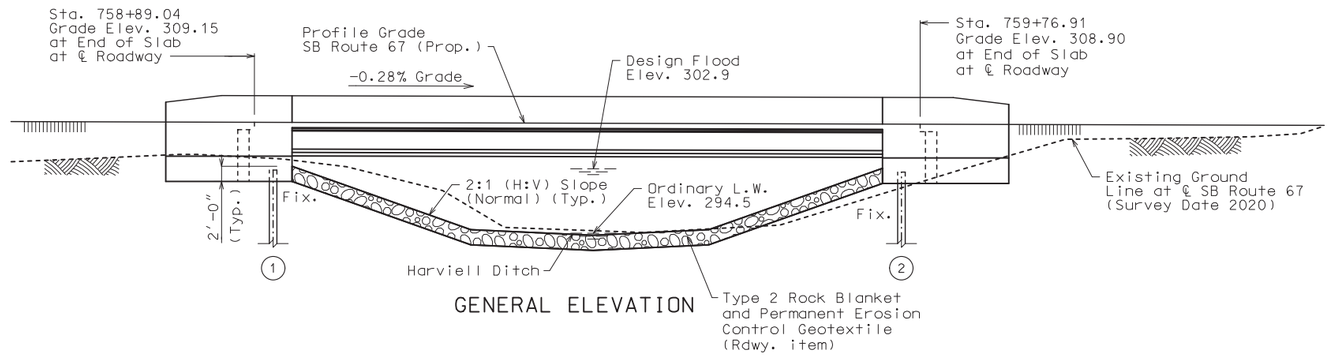
⊕ Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

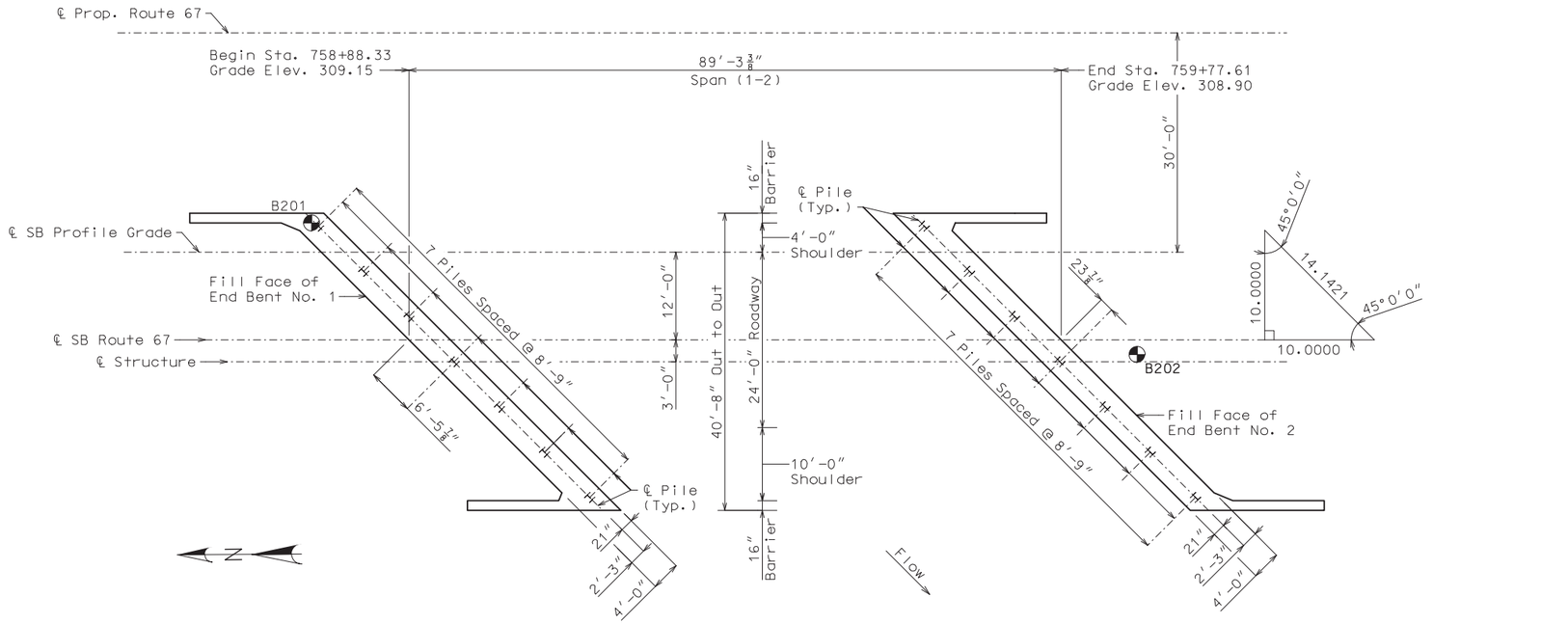
The locations of all subsurface borings for this structure are shown on the plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, are shown on Sheet(s) No. 23 & 24 and may be included in the Electronic Bridge Deliverables. They will also be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.

(82.9′) PRESTRESSED CONCRETE NU-GIRDER SPAN



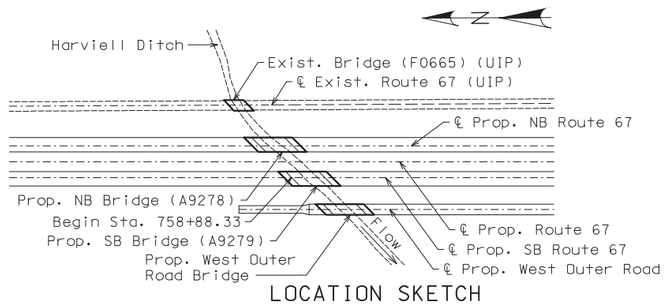
GENERAL ELEVATION



PLAN

B.M. #32
N: 282085.74
E: 814254.75
Sta. 719+83.75 Exist. Rte 67
Elev. 308.27
Chisled "□" on SW corner of west barrier curb on bridge F0665

Control Point #129
N: 281264.97
E: 814315.18
Sta. 728+04.49 Exist. Rte 67
Elev. 302.52
5/8″ rebar with MoDOT cap



LOCATION SKETCH

General Notes:

Longitudinal dimensions are measured horizontal.

For General Notes, Estimated Quantities and Foundation Data see Sheet No. 2.

GENERAL PLAN AND ELEVATION

BRIDGE: ROUTE 67 SB OVER HARVIELL DITCH

ROUTE 67 FROM ROUTE 158 TO ROUTE 142
ABOUT 3.2 MILES NORTH OF ROUTE 142
BEGINNING STATION 758+88.33 (℄ SB ROUTE 67)

Designed Sep. 2022
Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	1

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_001_J9P3751_General_Plan_and_Elevation.dgn 10:08:01 AM 3/3/2023

General Notes:

Design Specifications:

2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)
2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design (2nd Ed.) and 2014 Interim Revisions (Seismic)
Seismic Design Category = C
Design earthquake response spectral acceleration coefficient at 1.0 second period, S_{D1} = 0.34
Acceleration Coefficient (effective peak ground acceleration coefficient), A_s = 0.37

Design Loading:

Vehicular = HL-93
Future Wearing Surface = 35 lb/sf
Earth = 120 lb/cf
Equivalent Fluid Pressure = 45 lb/cf (Min.)
Superstructure: Non-composite for dead load. Composite for live load.

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-2 Concrete (Superstructure, except Prestressed Girders and Barrier)	f'c = 4,000 psi
Class B-1 Concrete (Barrier)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Steel HP Pile (ASTM A709 Grade 50S)	fy = 50,000 psi

For precast prestressed panel stresses, see Sheet No. 12.

For prestressed girder stresses, see Sheets No. 10 & 11.

Neoprene Pads:

Neoprene bearing pads shall be 60 durometer and shall be in accordance with Sec 716.

Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. Traffic to be maintained on other routes during construction. See roadway plans for traffic control.

Miscellaneous:

MoDOT Construction personnel will indicate the type of joint filler option used under the precast panels for this structure:

☐ Constant Joint Filler
☐ Variable Joint Filler

Estimated Quantities for Slab on Concrete NU-Girder

Item		Total
Class B-2 Concrete	cu. yard	161
Reinforcing Steel (Epoxy Coated)	pound	33,550

Notes:

The table of Estimated Quantities for Slab on Concrete NU-Girder represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard longitudinally from end of slab to end of slab and transversely from out to out of bridge slab (or with the horizontal dimensions as shown on the plan of slab). Payment for prestressed panels, conventional forms, all concrete and epoxy coated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

The Estimated Quantities for Slab on Concrete NU-Girder are based on skewed precast prestressed end panels.

Class B-2 Concrete quantity is based on minimum top flange thickness and minimum joint material thickness.

The prestressed panel quantities are not included in the table of Estimated Quantities for Slab on Concrete NU-Girder.

Estimated Quantities

Item		Substr.	Superstr.	Total
Class 1 Excavation	cu. yard	95		95
Bridge Approach Slab (Major)	sq. yard		171	171
Galvanized Structural Steel Piles (12 in.)	linear foot	1120		1120
Pile Point Reinforcement	each	14		14
Class B Concrete (Substructure)	cu. yard	63.8		63.8
Type D Barrier	linear foot		235	235
Slab on Concrete NU-Girder	sq. yard		398	398
NU 43, Prestressed Concrete NU-Girder	linear foot		335	335
Slab Drain	each		14	14
Vertical Drain at End Bents	each	2		2
Plain Neoprene Bearing Pad	each		8	8

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

Cost of L4x4 ASTM A709 Grade 36 HP pile anchors and 3/4-inch diameter ASTM F3125 Grade A325 Type 1 bolts, complete in place, will be considered completely covered by the contract unit price for Galvanized Structural Steel Piles (12 in.).

Foundation Data

Type	Design Data		Bent Number 1	Bent Number 2
Load Bearing Pile	Pile Type and Size		HP 12x53	HP 12x53
	Number	ea	7	7
	Approximate Length Per Each	ft	79	81
	Pile Point Reinforcement	ea	All	All
	Min. Galvanized Penetration (Elev.)	ft	281	280
	Pile Driving Verification Method		DF	DF
	Resistance Factor		0.4	0.4
	Minimum Nominal Axial Compressive Resistance	kip	523	523

DF = FHWA-modified Gates Dynamic Pile Formula

Load Bearing Pile:

$$\text{Minimum Nominal Axial Compressive Resistance} = \frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$$

All piles shall be galvanized down to the minimum galvanized penetration (elevation).

Pile point reinforcement need not be galvanized. Shop drawings will not be required for pile point reinforcement.

The contractor shall make every effort to achieve the minimum galvanized penetration (elevation) shown on the plans for all piles. Deviations in penetration less than 5 feet of the minimum will be considered acceptable provided the contractor makes the necessary corrections to ensure the minimum penetration is achieved on subsequent piles.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED: 3/3/2023
ROUTE: 67 | STATE: MO
DISTRICT: BR | SHEET NO.: 2
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

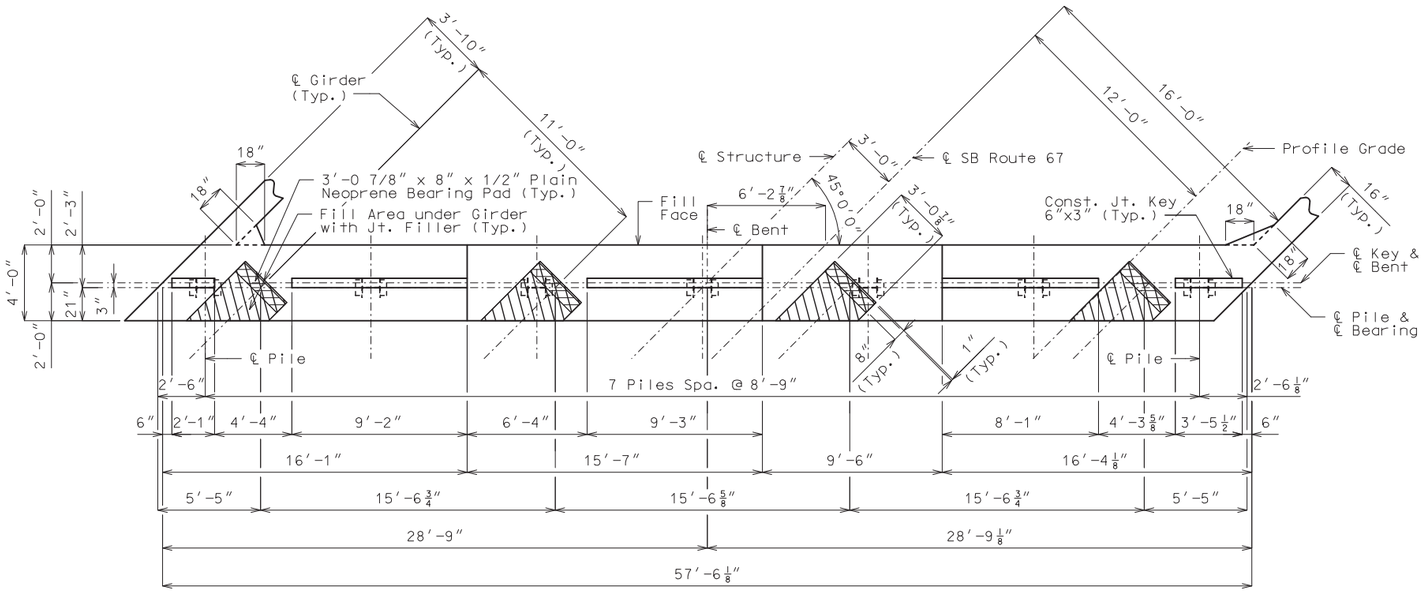
CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

ESTIMATED QUANTITIES AND GENERAL NOTES

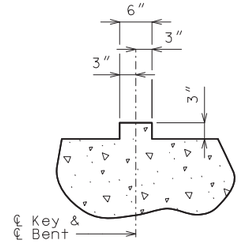
Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

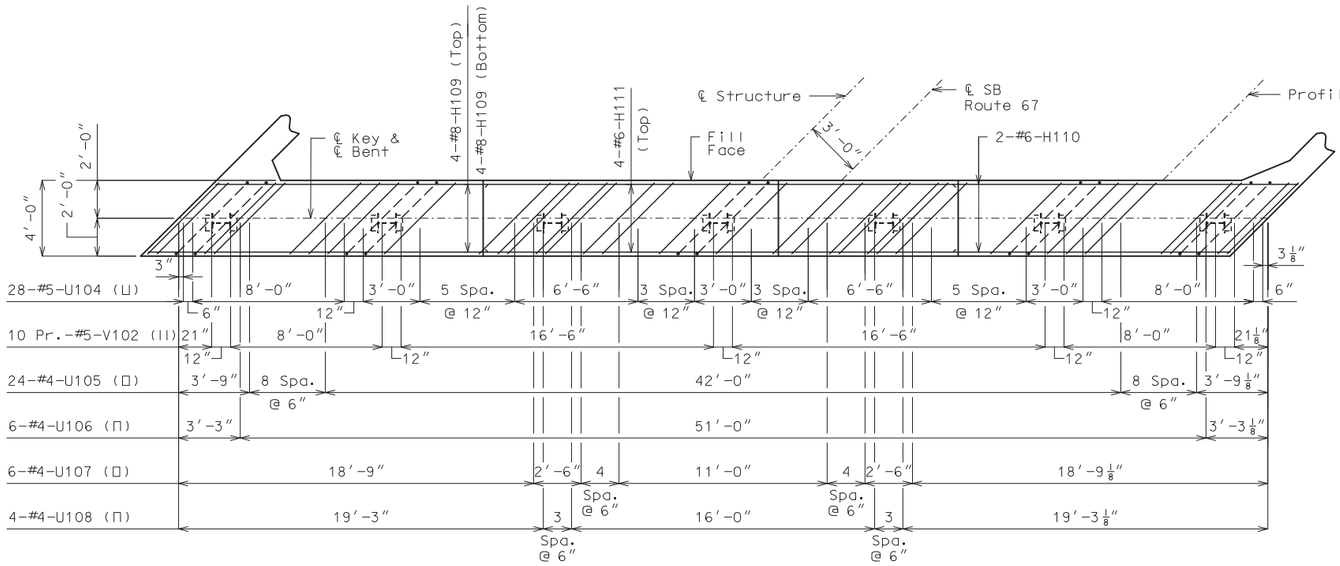
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_002_J9P3751_Estimated_Quantities_and_General_Notes.dgn 10:08:03 AM 3/3/2023



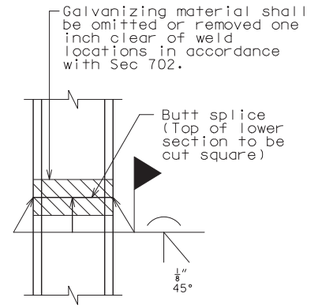
PLAN OF BEAM SHOWING DIMENSIONS



TYPICAL SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT
(Keys not shown for clarity)



STEEL PILE SPLICE
(If required)

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 4 & 5.

For details of Vertical Drain at End Bents, see Sheet No. 6.

The U bars and pairs of V bars shall be placed parallel to centerline of roadway.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

DETAILS OF END BENT NO. 1

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	3

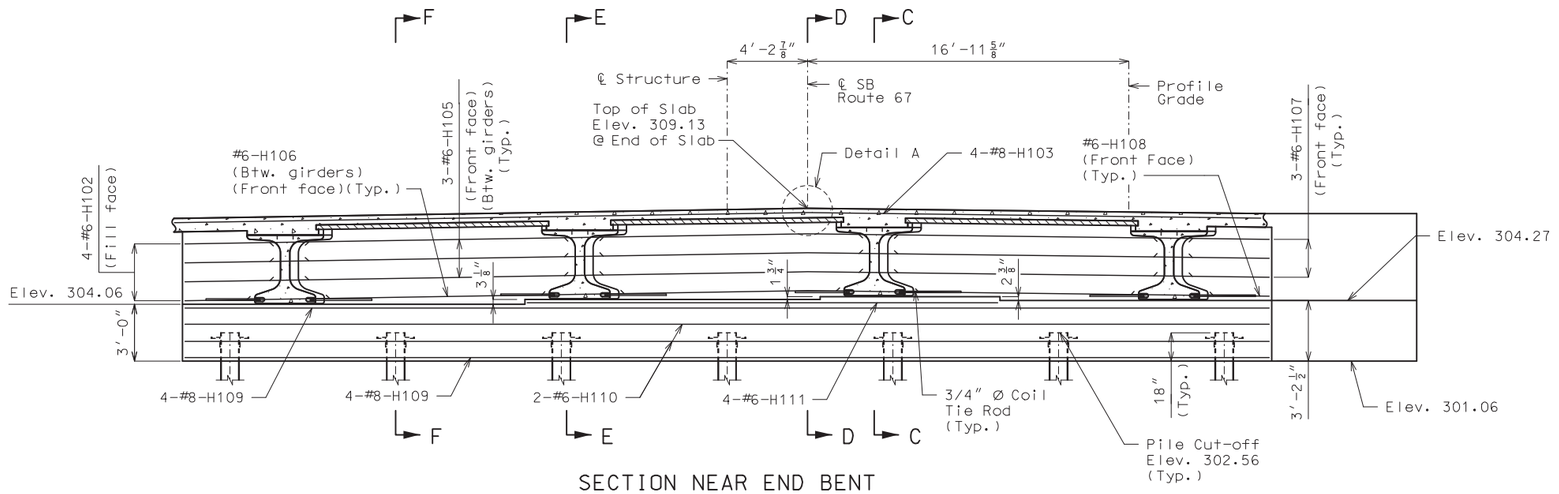
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

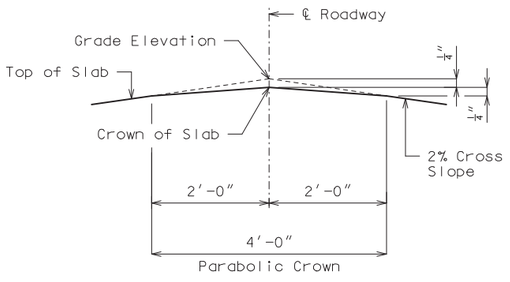
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



SECTION NEAR END BENT

Keys not shown for clarity.



DETAIL A

PART PLAN

✳ Centered behind girders
✳✳ 4-#5-U109 & 4-#6-U103 (Spa. with U104 & V102)
✳✳✳ 4-#5-U109 & 4-#6-U103 (Spa. with U104)

DETAILS OF END BENT NO. 1

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 3 & 5.

For Sections C-C, D-D, E-E, & F-F, see Sheet No. 5.

For Elevations A-A & B-B, see Sheet No. 5.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For location of Coil Tie Rods and #5-H104 (Strand Tie Bar), see Sheets No. 10 and 11.

For details of Vertical Drain at End Bents, see Sheet No. 6.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2″.

The #6-F100 and #6-F101 bars shall be bent in the field to clear girders.

The U bars shall be placed parallel to centerline of roadway.

Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.

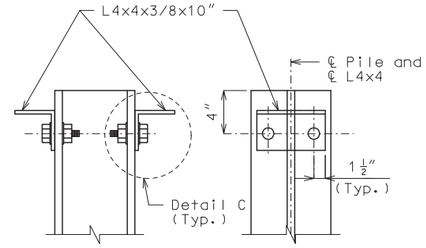
For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Bridge Approach Slab, see Sheet No. 19.

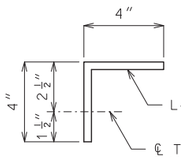
Substructure Quantity Table for Bent No. 1

Item		Quantity
Class 1 Excavation	cu. yard	75
Galvanized Structural Steel Piles (12 in.)	linear foot	553
Pile Point Reinforcement	each	7
Class B Concrete (Substructure)	cu. yard	31.9

Note: These quantities are included in the Estimated Quantities table on Sheet No. 2.



DETAILS OF HP PILE ANCHORS



DETAIL C

Angles shall be coated with a minimum of two coats of non-aluminum epoxy mastic primer to provide a dry film thickness of 4 mils minimum, 8 mils maximum, or galvanized in accordance with Sec 1081. Bolts, washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

JOSHUA D. JOLLIFF NUMBER PE-2006002824 PROFESSIONAL ENGINEER STATE OF MISSOURI
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	4

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9279

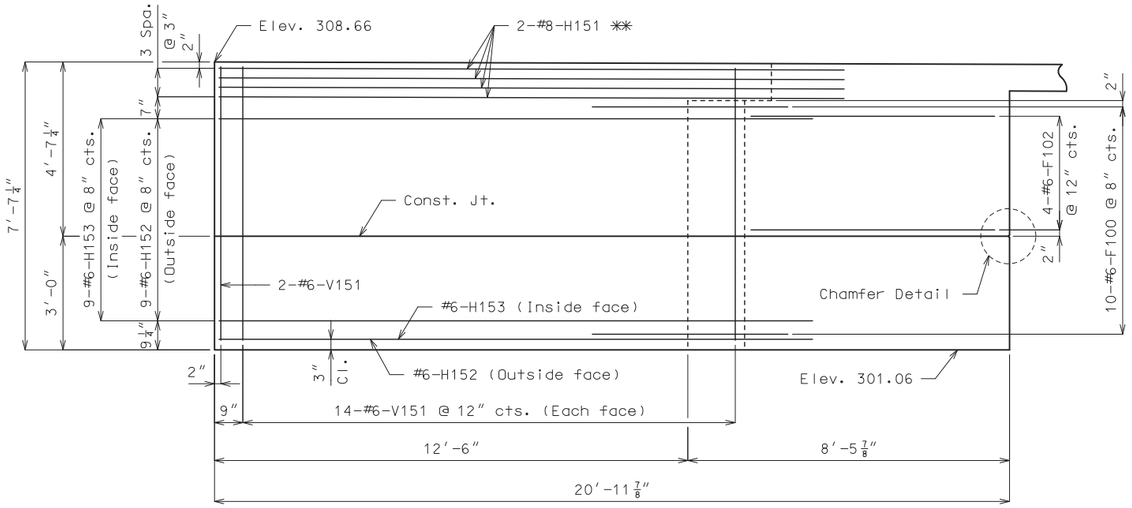
REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

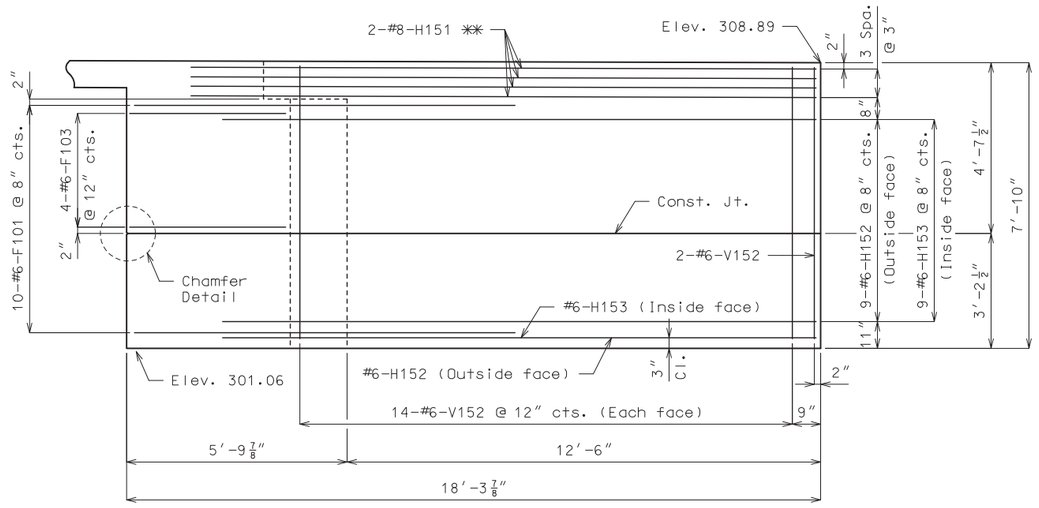
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_004_J9P3751_End_Bent_1_Details.dgn 10:08:05 AM 3/3/2023

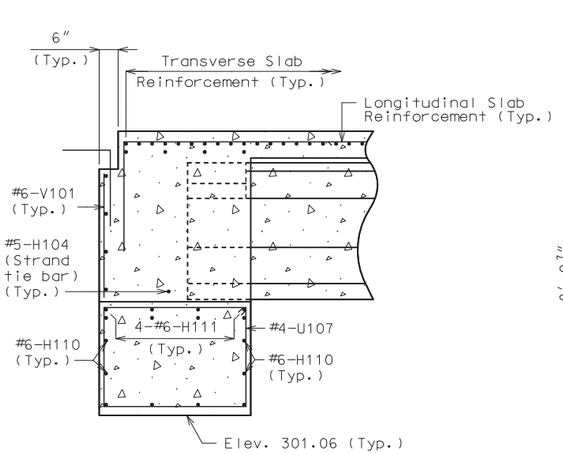


ELEVATION A-A

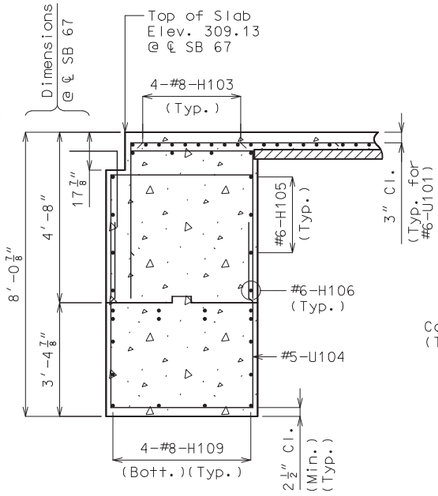


ELEVATION B-B

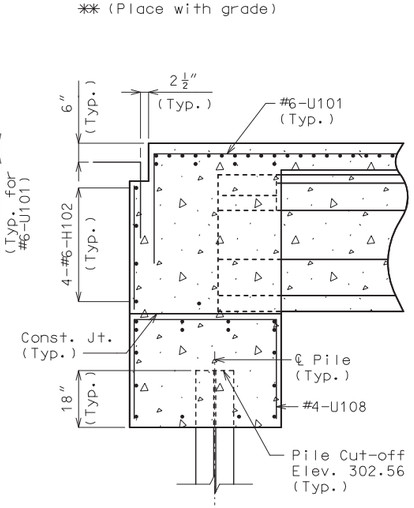
** (Place with grade)



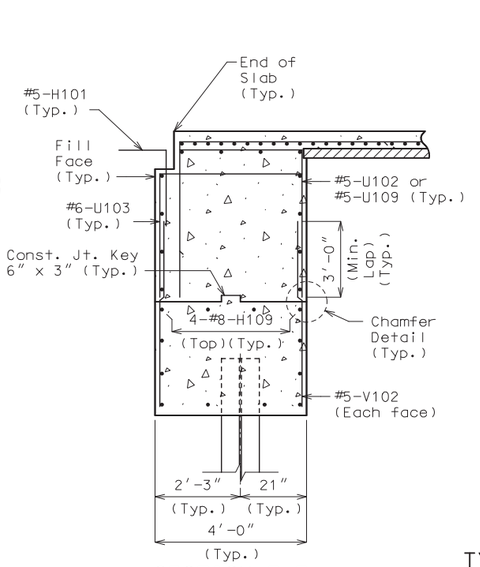
SECTION C-C



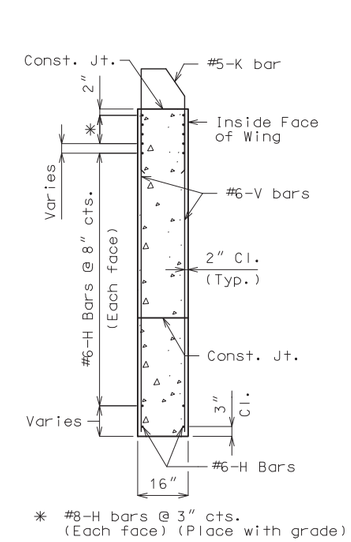
SECTION D-D



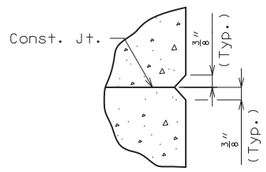
SECTION E-E



SECTION F-F



TYPICAL SECTION THRU WING



CHAMFER DETAIL

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 3 & 4.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

The #6-F100 and #6-F101 bars shall be bent in field to clear girders.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Vertical Drain at End Bents, see Sheet No. 6.

For location of #5-H104 (Strand tie bar), see Sheets No. 10 and 11.

For location of Sections C-C, D-D, E-E, & F-F, see Sheet No. 4.

For location of Elevations A-A & B-B, see Sheet No. 4.

For details of Bridge Approach Slab, see Sheet No. 19.

DETAILS OF END BENT NO. 1

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	5

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9279

DESCRIPTION	DATE

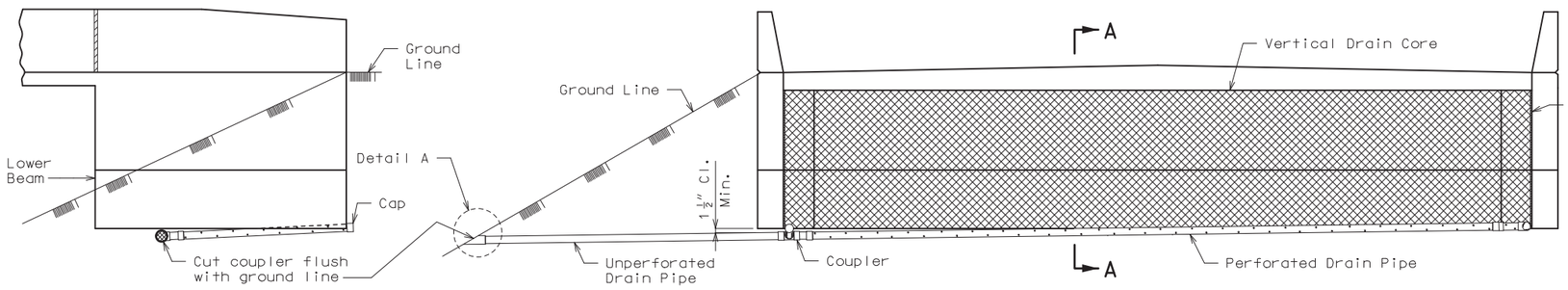
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

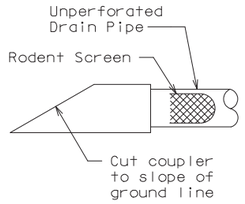
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

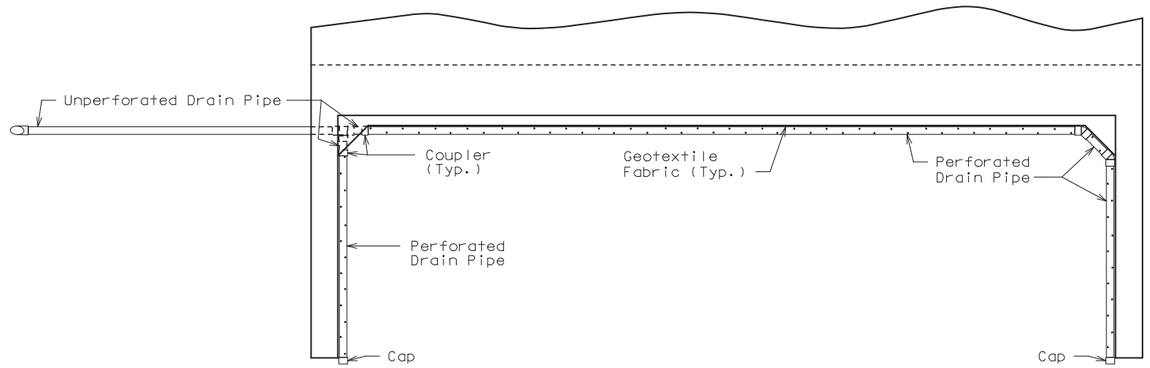


ELEVATION OF WING

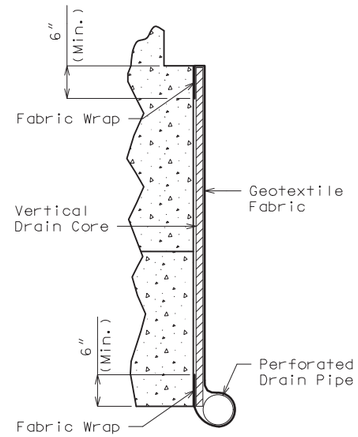
ELEVATION OF END BENT



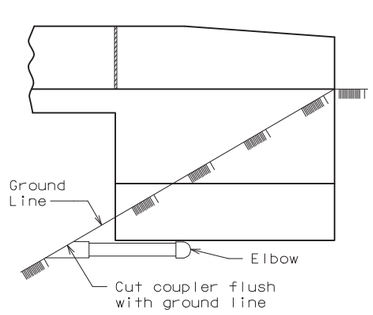
DETAIL A



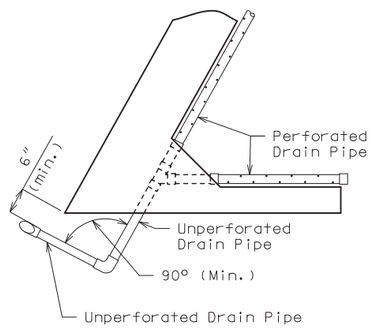
PLAN OF END BENT



PART SECTION A-A
(Section thru wing similar)



ELEVATION OF WING



PART PLAN

OPTIONAL TURNED DRAIN
(Use only when straight drain is not practical.)

General Notes:

All drain pipe shall be sloped 1 to 2 percent.

Drain pipe may be either 6-inch diameter corrugated metallic-coated steel pipe underdrain, 4-inch diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4-inch diameter corrugated polyethylene (PE) drain pipe.

Drain pipe shall be placed at fill face of end bent and inside face of wings. The pipe shall slope to lowest grade of ground line, also missing the lower beam of end bent by a minimum of 1 1/2 inches.

Perforated pipe shall be placed at fill face side and inside face of wings at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.

VERTICAL DRAIN AT END BENTS
(Squared end bent shown, skewed end bent similar)

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	6

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

DATE	DESCRIPTION

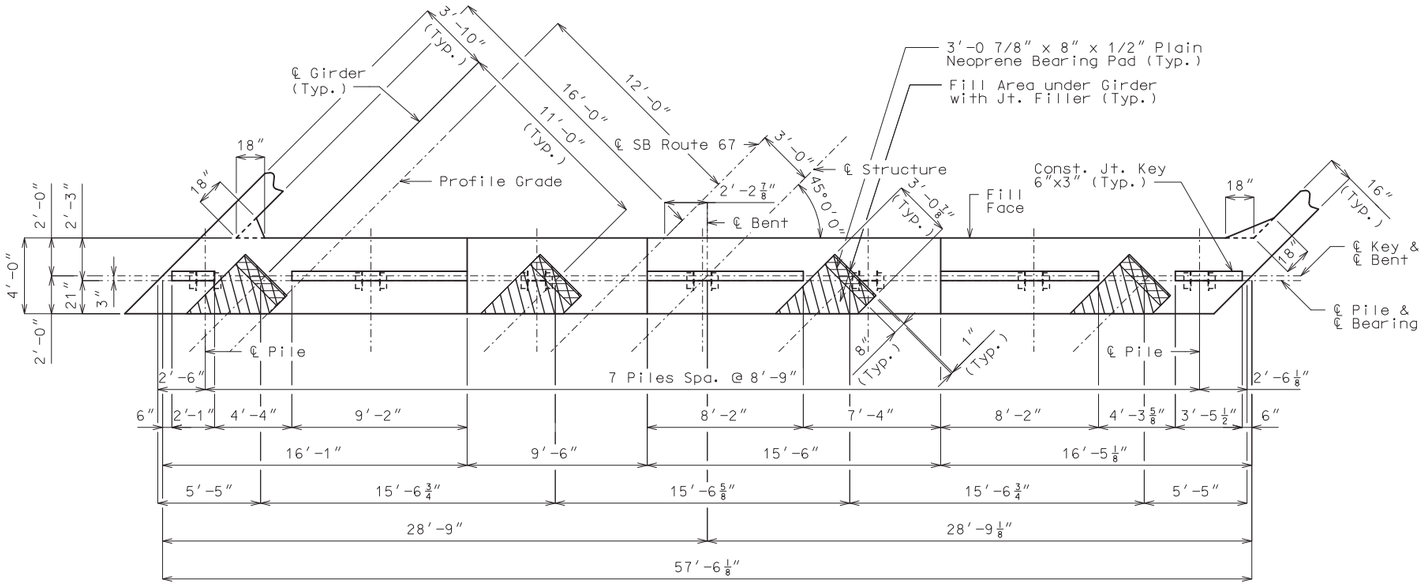
REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

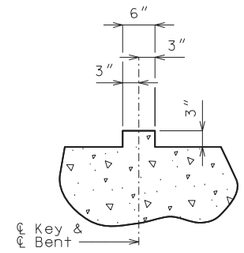
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

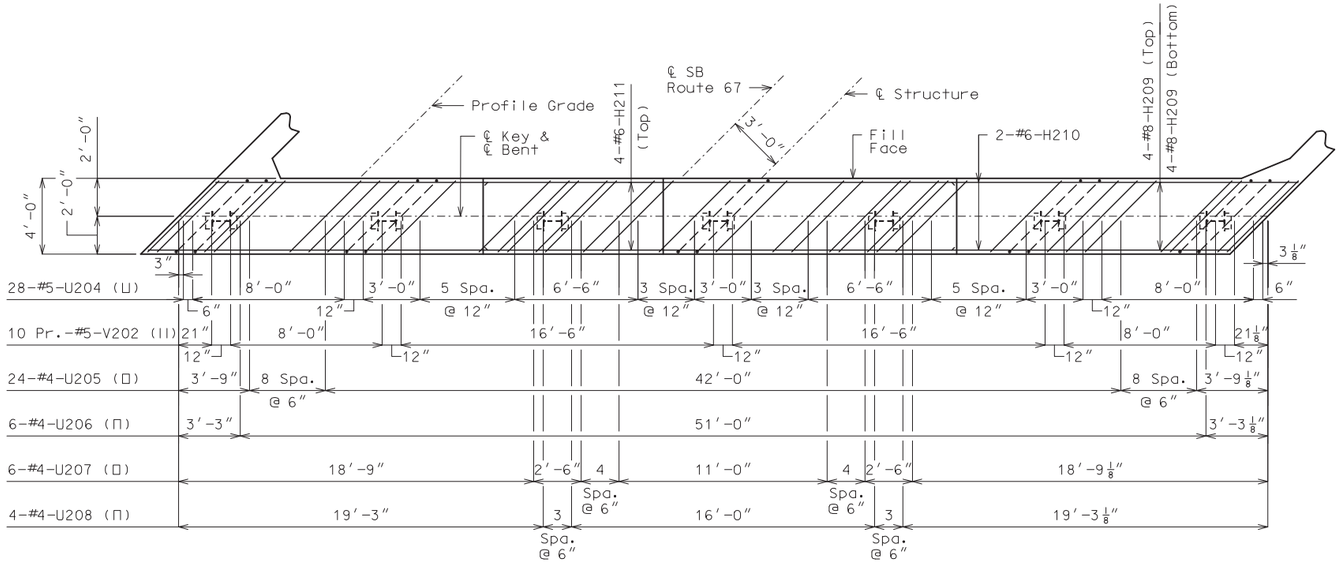
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



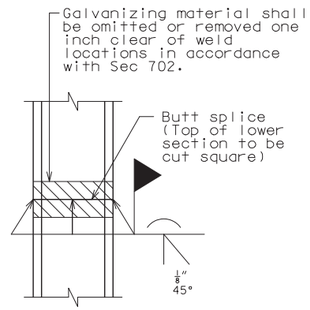
PLAN OF BEAM SHOWING DIMENSIONS



TYPICAL SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT
(Keys not shown for clarity)



STEEL PILE SPLICE
(If required)

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 8 & 9.

For details of Vertical Drain at End Bents, see Sheet No. 6.

The U bars and pairs of V bars shall be placed parallel to centerline of roadway.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

DETAILS OF END BENT NO. 2

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	7

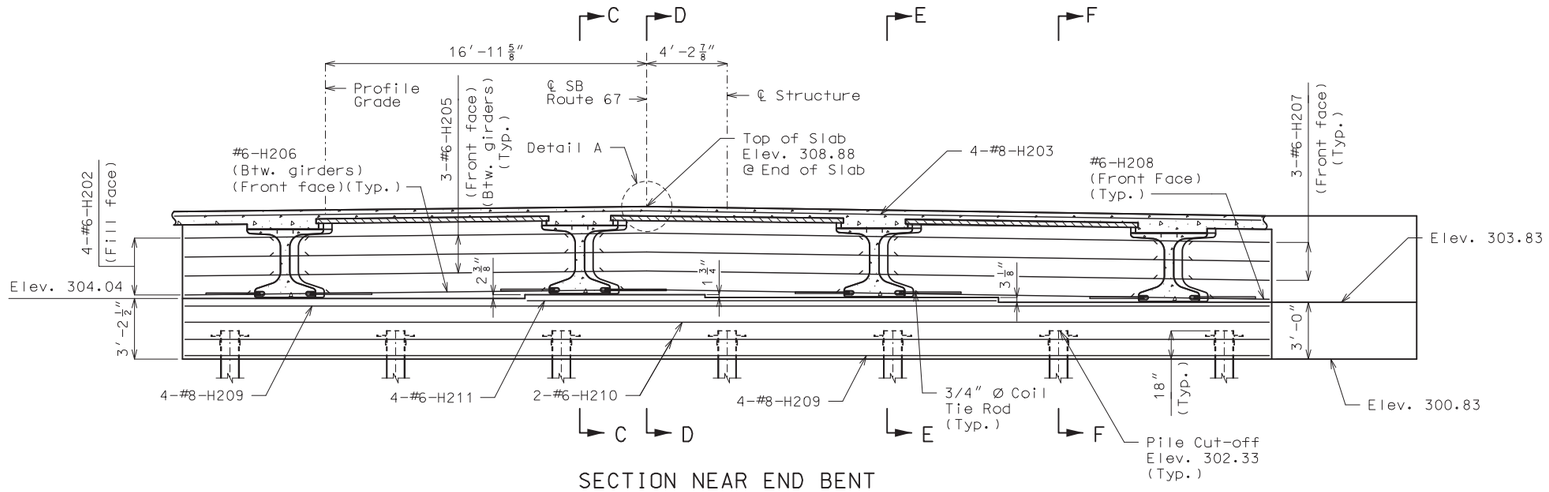
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

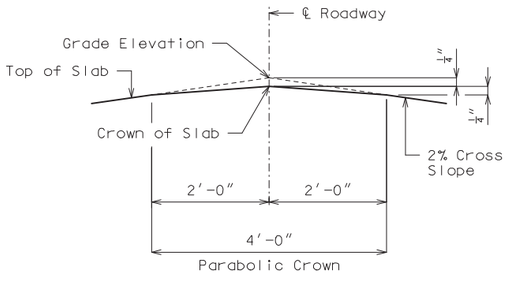
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



SECTION NEAR END BENT

Keys not shown for clarity.



DETAIL A

PART PLAN

✳ Centered behind girders
✳✳ 4-#5-U209 & 4-#6-U203 (Spa. with U204 & V202)
✳✳✳ 4-#5-U209 & 4-#6-U203 (Spa. with U204)

DETAILS OF END BENT NO. 2

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 7 & 9.

For Sections C-C, D-D, E-E, & F-F, see Sheet No. 9.

For Elevations A-A & B-B, see Sheet No. 9.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For location of Coil Tie Rods and #5-H204 (Strand Tie Bar), see Sheets No. 10 and 11.

For details of Vertical Drain at End Bents, see Sheet No. 6.

Reinforcing steel shall be shifted to clear piles. U bars shall clear piles by at least 1 1/2″.

The #6-F200 and #6-F201 bars shall be bent in the field to clear girders.

The U bars shall be placed parallel to centerline of roadway.

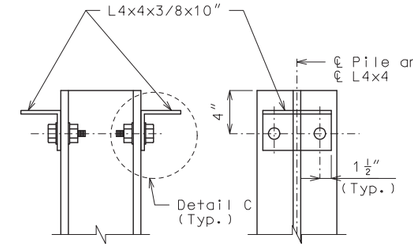
Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

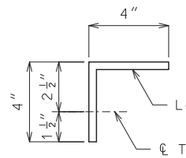
For details of Bridge Approach Slab, see Sheet No. 19.

Substructure Quantity Table for Bent No. 2		
Item		Quantity
Class 1 Excavation	cu. yard	20
Galvanized Structural Steel Piles (12 in.)	linear foot	567
Pile Point Reinforcement	each	7
Class B Concrete (Substructure)	cu. yard	31.9

Note: These quantities are included in the Estimated Quantities table on Sheet No. 2.



DETAILS OF HP PILE ANCHORS



DETAIL C

Angles shall be coated with a minimum of two coats of non-aluminum epoxy mastic primer to provide a dry film thickness of 4 mils minimum, 8 mils maximum, or galvanized in accordance with Sec 1081. Bolts, washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	8

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

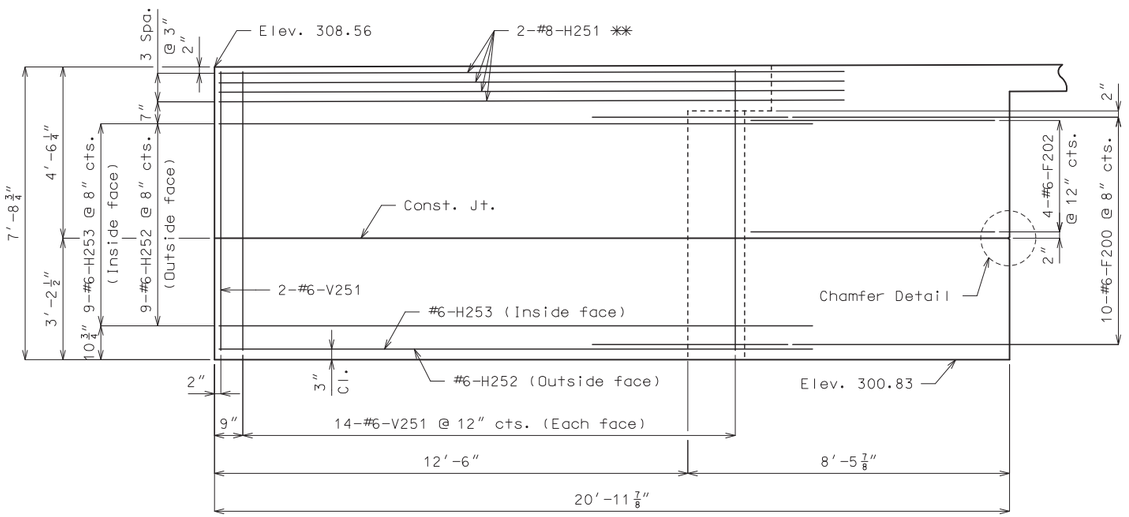
BRIDGE NO. A9279

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

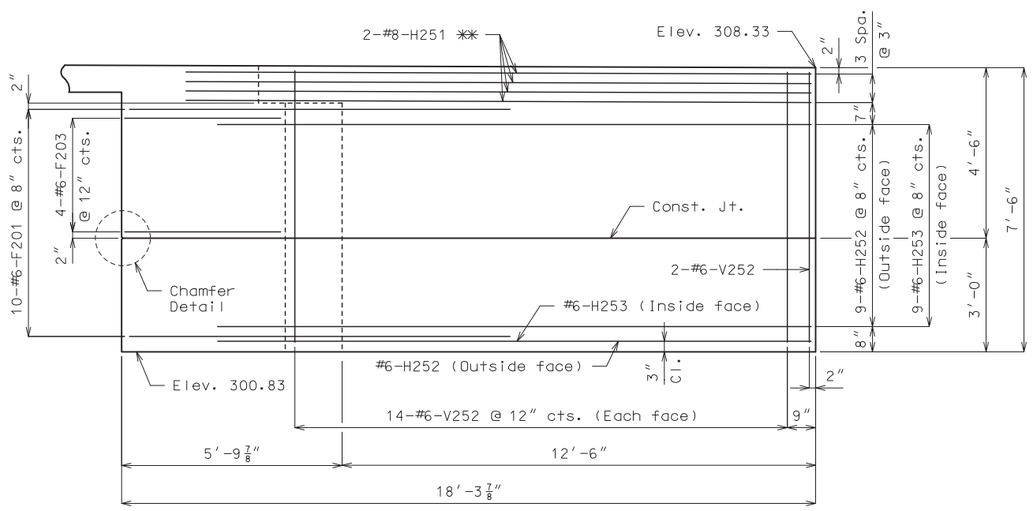
REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

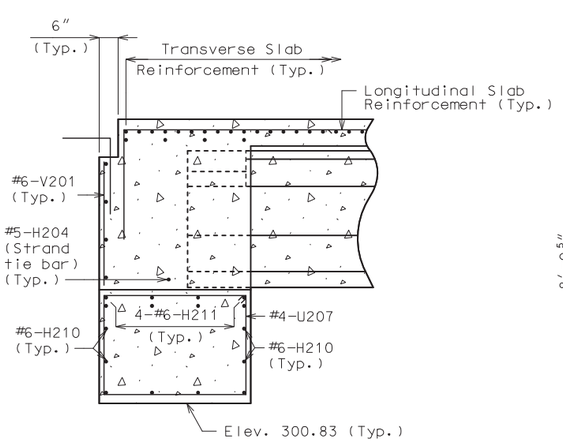


ELEVATION A-A

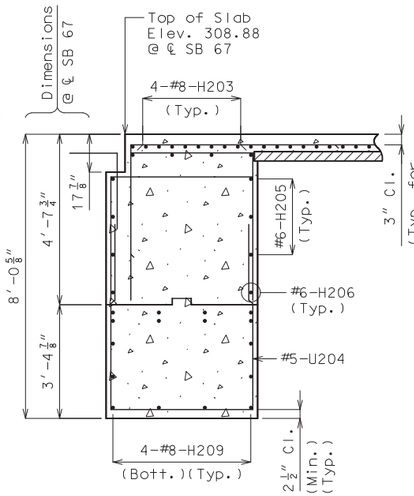


ELEVATION B-B

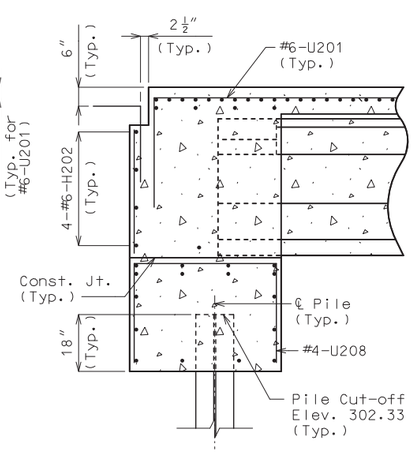
** (Place with grade)



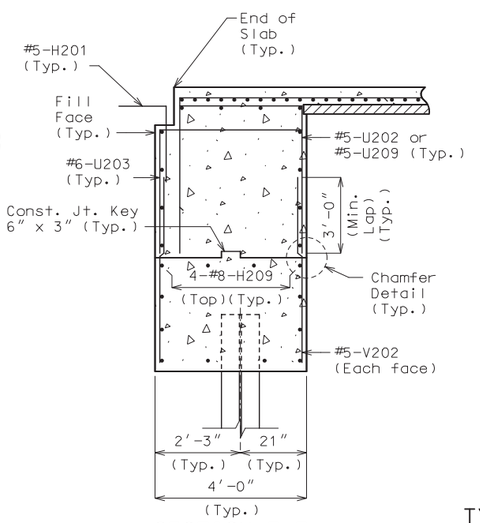
SECTION C-C



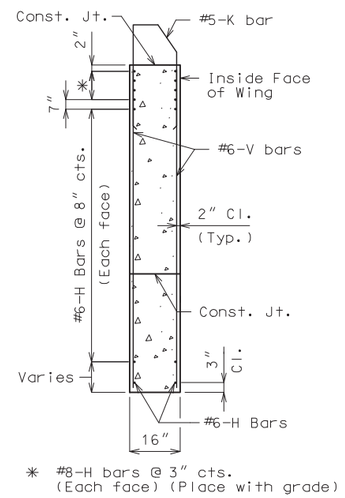
SECTION D-D



SECTION E-E

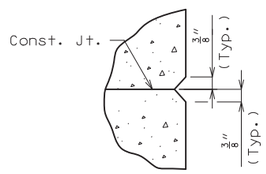


SECTION F-F



* #8-H bars @ 3″ cts. (Each face) (Place with grade)

TYPICAL SECTION THRU WING



CHAMFER DETAIL

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 7 & 8.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

The #6-F200 and #6-F201 bars shall be bent in field to clear girders.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Vertical Drain at End Bents, see Sheet No. 6.

For location of #5-H204 (Strand tie bar), see Sheets No. 10 and 11.

For location of Sections C-C, D-D, E-E, & F-F, see Sheet No. 8.

For location of Elevations A-A & B-B, see Sheet No. 8.

For details of Bridge Approach Slab, see Sheet No. 19.

DETAILS OF END BENT NO. 2

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	9

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

DESCRIPTION	DATE

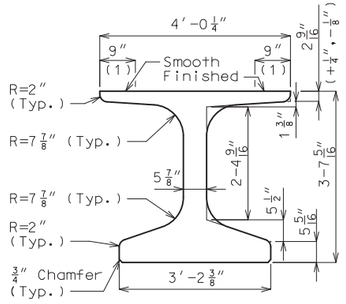
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

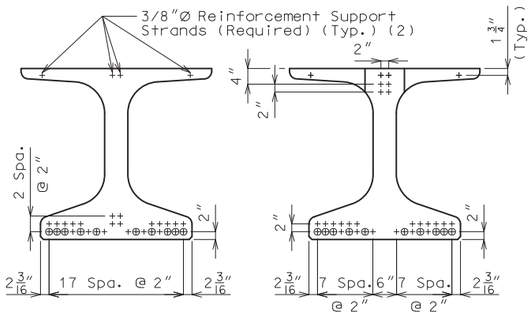
REV.

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



DIMENSIONS

(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about ℄ Girder. May be moved laterally in pairs.

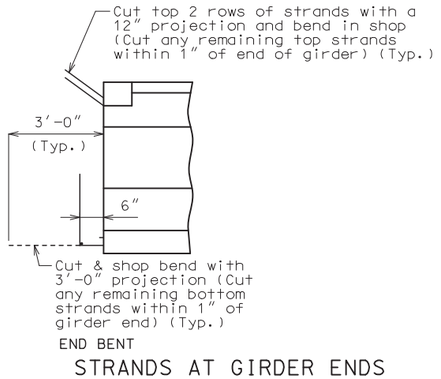


℄ GIRDER END OF GIRDER

STRAND ARRANGEMENT

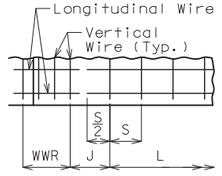
+ Indicates prestressing strand.

o Indicates cut & shop bend with 3′-0″ projection.



END BENT

STRANDS AT GIRDER ENDS



WELDED WIRE PLACEMENT

S = Vertical wire spacing

L = Length of WWR mats

J = Distance between WWR mats

Bill of Reinforcing Steel

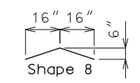
Bars Each Girder

No.	Size/Mark	Length	Shape
105	3 G1	2′-10″	8
2	4 G3	5′-5″	20
14	4 G6	Varies	20

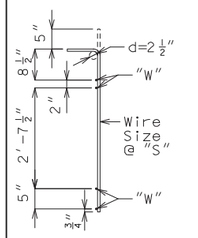
Welded Wire Each Girder

Mark	Size	S	W	L	J
WWR1	D31	4″	W12	4′-4″	8″
WWR2	D31	8″	W12	22′-8″	12″
WWR3	D31	12″	W12	23′-0″	–
WWR6	D31	2″	W12	16″	2¾″

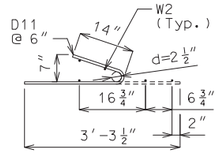
Bending Diagrams



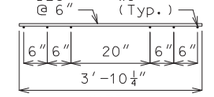
Shape 20



WWR1, WWR2, WWR3 & WWR6



WWR4



WWR5

All dimensions are out to out.

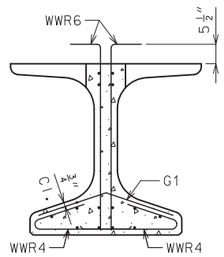
Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1″, unless otherwise shown.

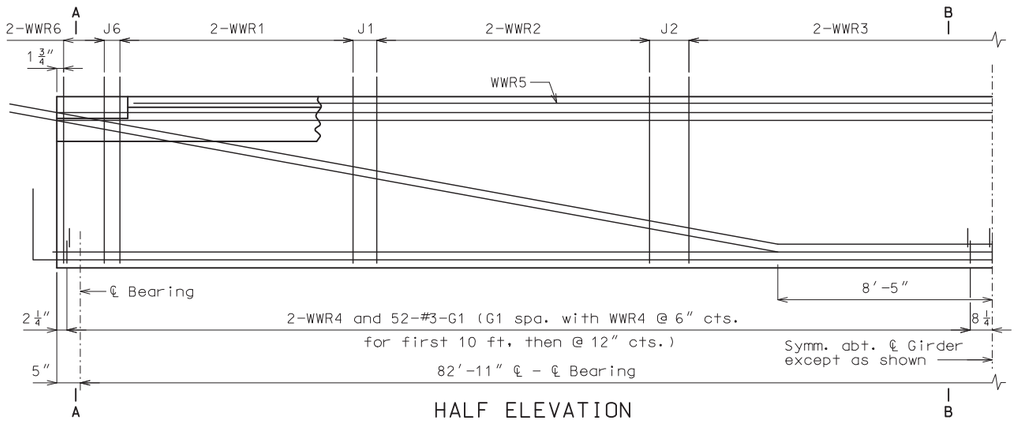
All bar reinforcement shall be Grade 60.

WWR shall not be epoxy coated.



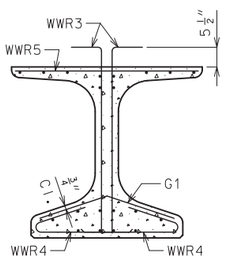
SECTION A-A

Strands not shown for clarity.



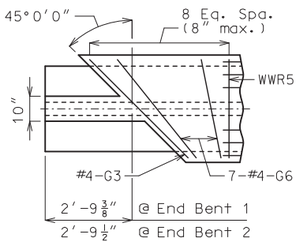
HALF ELEVATION

Reinforcement support strands not shown for clarity.

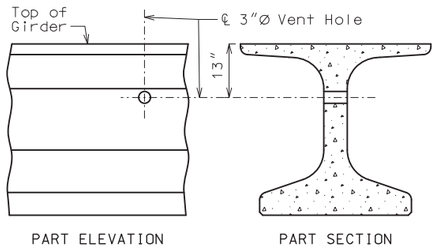


SECTION B-B

Strands not shown for clarity.



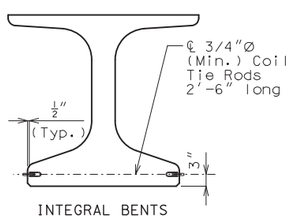
TOP FLANGE BLOCKOUT



PART ELEVATION PART SECTION

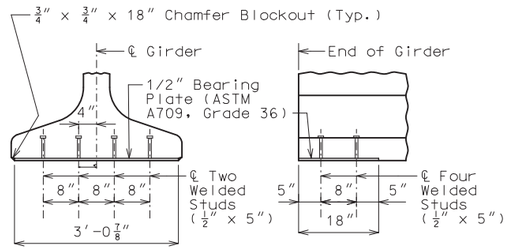
VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum.



INTEGRAL BENTS

COIL TIES



END VIEW SIDE VIEW

BEARING PLATE

NU-GIRDERS - SPAN (1-2)

General Notes:

Concrete for prestressed beams shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

Use 30 strands, 0.6″Ø Grade 270, with an initial prestress force of 1318 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

For Girder Camber Diagram, see Sheet No. 14.

For location of coil inserts at slab drains, see Sheet No. 13.

For location of coil ties at integral bents see Sheets No. 4 and 8.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_010_J9P3751_NU_Girder_WWR.dgn 10:08:12 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	10

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9279

NO.	DESCRIPTION	DATE

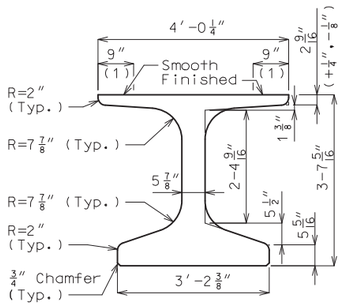
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

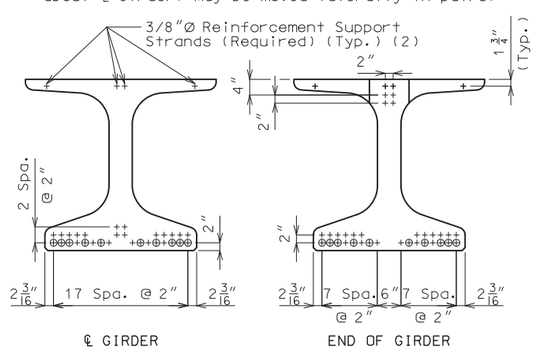
REV.

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



DIMENSIONS

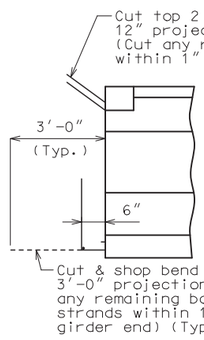
(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about ℄ Girder. May be moved laterally in pairs.



STRAND ARRANGEMENT

+ Indicates prestressing strand.

o Indicates cut & shop bend with 3′-0″ projection.

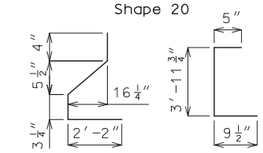


STRANDS AT GIRDER ENDS

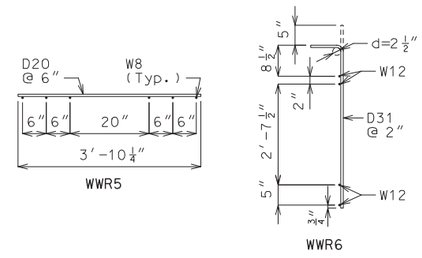
Bill of Reinforcing Steel - Each Girder

No.	Size/ Mark	Length	Shape
216	5 B1	5′-0″	11
236	4 D1	4′-0″	9
2	4 G3	5′-5″	20
14	4 G6	Varies	20

Bending Diagrams



Welded Wire Reinforcement - Each Girder



All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

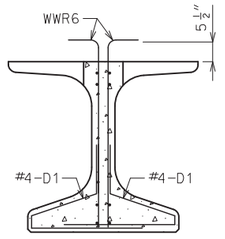
Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1″.

All bar reinforcement shall be Grade 60.

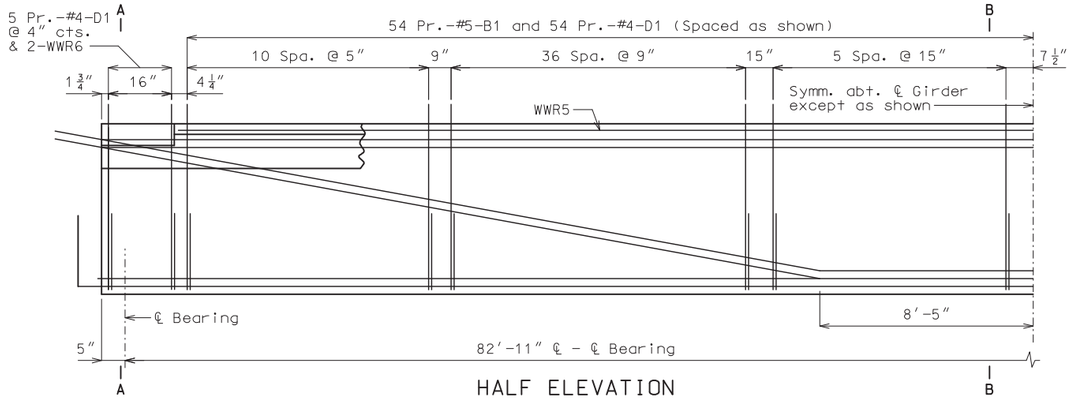
The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 bars shall be epoxy coated.



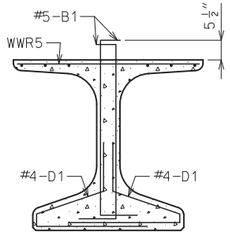
SECTION A-A

Strands not shown for clarity.



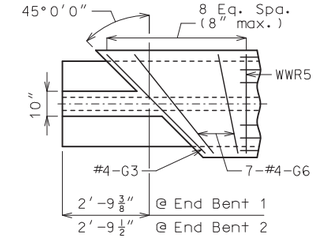
HALF ELEVATION

Reinforcement support strands not shown for clarity.

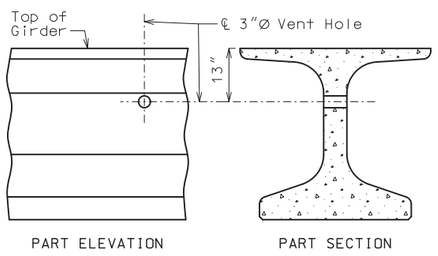


SECTION B-B

Strands not shown for clarity.

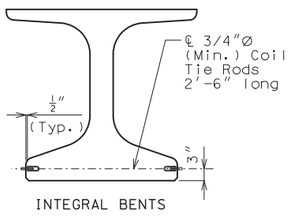


TOP FLANGE BLOCKOUT

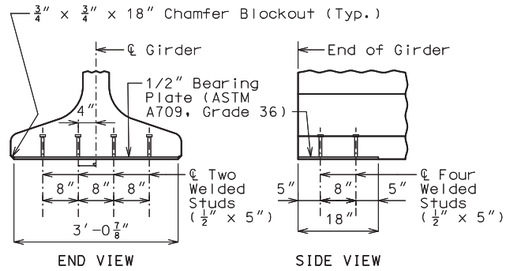


VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum.



COIL TIES



BEARING PLATE

General Notes:

Concrete for prestressed girders shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

Use 30 strands, 0.6″Ø Grade 270, with an initial prestress force of 1318 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

For Girder Camber Diagram, see Sheet No. 14.

For location of coil inserts at slab drains, see Sheet No. 13.

For location of coil ties at integral bent, see Sheets No. 4 and 8.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

NU-GIRDERS (ALTERNATE REINFORCEMENT) - SPAN (1-2)

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	11

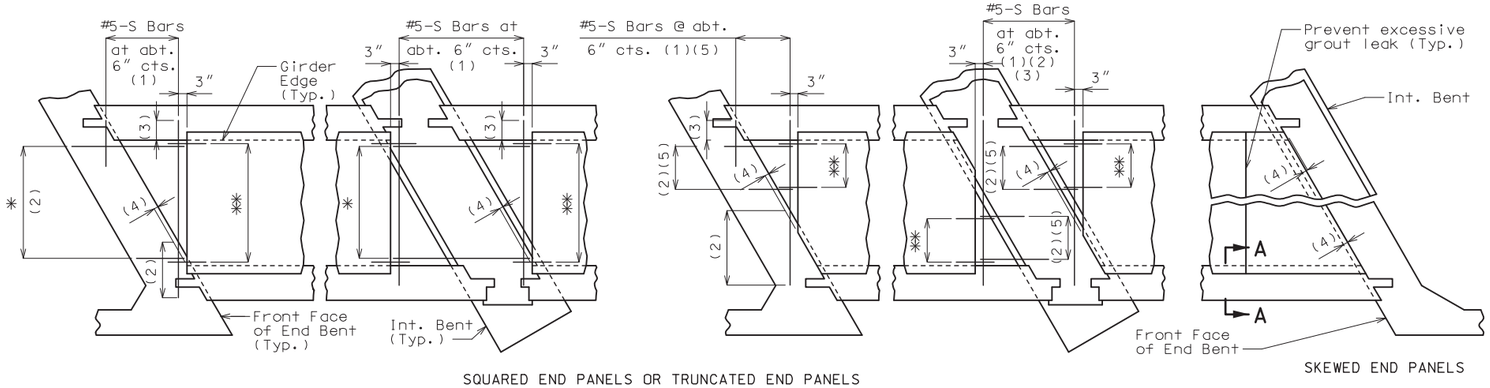
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

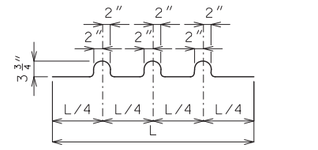
CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

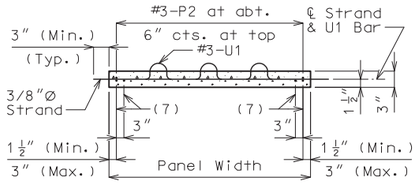


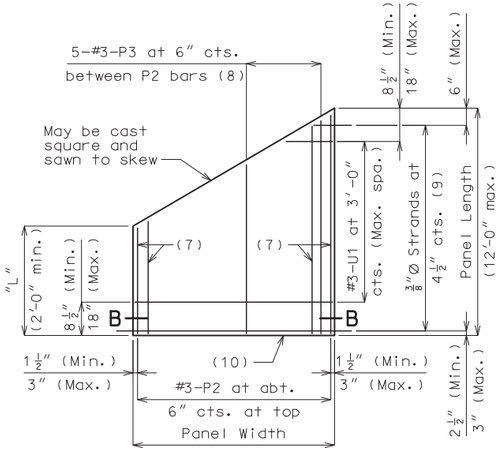
PLAN SHOWING PANELS PLACEMENT

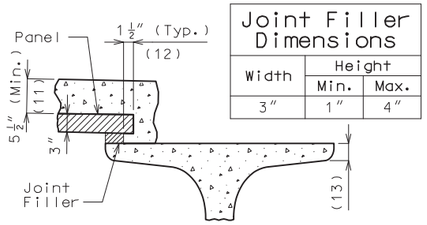
✳ #5-S Bars at abt. 9" cts. (1)
✳✳ #3-P1 at 12" cts. (End panels only)



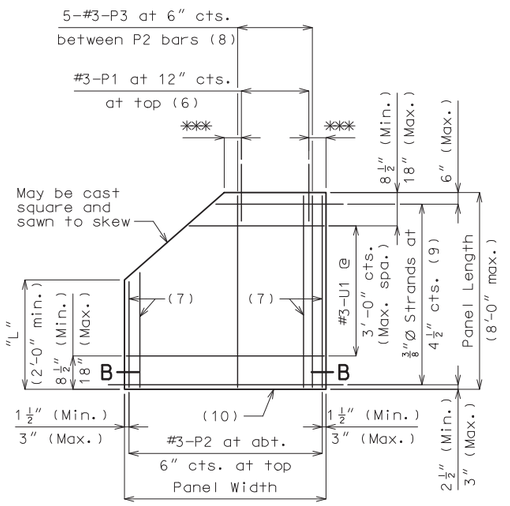
U1 Bars may be oriented at right angles to location and spacing shown. U1 Bars shall be placed between P1 bars.



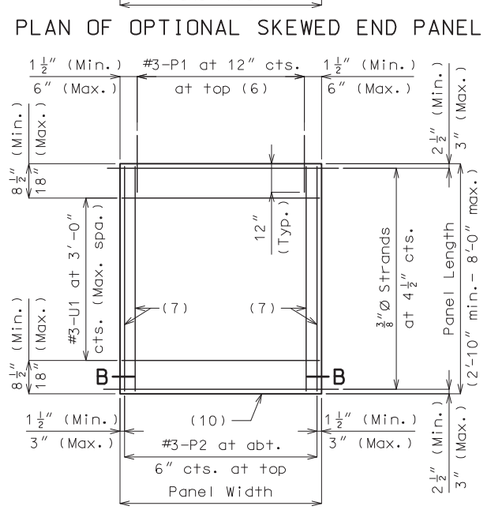




Joint Filler Dimensions		
Width	Height	
	Min.	Max.
3"	1"	4"



✳✳✳ 3" (Min.), 6" (Max.)



General Notes:

Prestressed Panels:

Concrete for prestressed panels shall be Class A-1 with f'c = 6,000 psi, f'ci = 4,000 psi.

The top surface of all panels shall receive a scored finish with a depth of scoring of 1/8" perpendicular to the prestressing strands in the panels.

Prestressing tendons shall be high-tensile strength, uncoated, seven-wire, low-relaxation strands for prestressed concrete in accordance with AASHTO M 203 Grade 270, with nominal diameter of strand = 3/8" and nominal area = 0.085 sq.in. and minimum ultimate strength = 22.95 kips (270 ksi). Larger strands may be used with the same spacing and initial tension.

Initial prestressing force = 17.2 kips/strand.

The method and sequence of releasing the strands shall be shown on the shop drawings.

Suitable anchorage devices for lifting panels may be cast in panels, provided the devices are shown on the shop drawings and approved by the engineer. Panel lengths shall be determined by the contractor and shown on the shop drawings.

When squared end panels are used at skewed bents, the skewed portion shall be cast full depth. No separate payment will be made for additional concrete and reinforcing required.

Support from diaphragm forms is required under the optional skewed end until cast-in-place concrete has reached 3,000 psi compressive strength.

Prestressed panels shall be brought to saturated surface-dry (SSD) condition just prior to the deck pour. There shall be no free standing water on the panels or in the area to be cast.

The prestressed panel quantities are not included in the table of estimated quantities for the slab.

Reinforcing Steel:

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

If U1 bars interfere with placement of slab steel, U1 loops may be bent over, as necessary, to clear slab steel.

Deformed welded wire reinforcement (WWR) providing a minimum area of reinforcing perpendicular to strands of 0.22 sq in./ft, with spacing parallel to strands sufficient to ensure proper handling, may be used in lieu of the #3-P2 bars shown. Wire diameter shall not be larger than 0.375 inch. The above alternative reinforcement criteria may be used in lieu of the #3-P3 bars, when required, and placed over a width not less than 2 feet.

The following reinforcing steel shall be tied securely to the strands with the following maximum spacing in each direction:
#3-P2 bars at 16 inches.
WWR at 24 inches.

The #3-U1 bars shall be tied securely to #3-P2 bars, to WWR or to strands (when placed between P1 bars) at about 3-foot centers.

Minimum reinforcement steel length shall be 2'-0".

All reinforcement other than prestressing strands shall be epoxy coated.

Precast panels may be in contact with stirrup reinforcing in diaphragms.

S-bars are not listed in the bill of reinforcing.

Cost of S-bars will be considered completely covered by the contract unit price for the slab.

Joint Filler:

Joint filler shall be preformed fiber expansion joint material in accordance with Sec 1057 or expanded or extruded polystyrene bedding material in accordance with Sec 1073.

Use Slab Haunching Diagram on Sheet No. 14 for determining thickness of joint filler within the limits noted in the table of Joint Filler Dimensions.

Thicker material may be used on one or both sides of the girder to reduce cast-in-place concrete thickness to within tolerances.

The same thickness of preformed fiber expansion joint material shall be used under any one edge of any panel except at locations where top flange thickness may be stepped. The maximum change in thickness between adjacent panels shall be 1/4 inch. The polystyrene bedding material may be cut with a transition to match haunch height above top of flange.

Joint filler shall be glued to the girder. When thickness exceeds 1 1/2 inches, the joint filler shall be glued top and bottom. The glue used shall be the type recommended by the joint filler manufacturer.

Edges of panels shall be uniformly seated on the joint filler before slab reinforcement is placed.

Reference Notes:

Plan of Panels Placement:

(1) S-bars shown are bottom steel in slab between panels and used with squared and truncated end panels only.

(2) Extend S-bars 18 inches beyond the front face of end bents and int. bents for squared and truncated end panels only.

(3) Extend S-bars 9 inches beyond edge of girder (Typ.).

(4) End panels shall be dimensioned 1/2" min. to 1 1/2" max. from the inside face of diaphragm.

(5) For truncated end panels, use a min. of #5-S bars at 6" crossings in openings, or min. 4x4-W7xW7.

Plans of Panels:

(6) For end panels only, P1 bars shall be 2'-0" in length and embedded 12". P1 bars will not be required for panels at squared integral end bents.

(7) #3-P2 bars near edge of panel at bottom (under strands).

(8) Use #3-P3 bars if panel is skewed 45° or greater.

(9) Any strand 2'-0" or shorter shall have a #4 reinforcing bar on each side of it, centered between strands. Strands 2'-0" or shorter may then be debonded at the fabricator's option.

(10) Optional 1/2" x 45° Chamfer one or both sides at bottom.

Section A-A:

(11) Slab thickness over prestressed panels varies due to girder camber. In order to maintain minimum slab thickness, it may be necessary to raise the grade uniformly throughout the structure. No payment will be made for additional labor or materials required for necessary grade adjustment.

(12) Contractor shall ensure proper consolidation under and between panels.

(13) At the contractor's option, the variation in slab thickness over prestressed panels may be eliminated or reduced by increasing and varying the girder top flange thickness. Dimensions shall be shown on the shop drawings.

DETAILS OF PRESTRESSED PANELS

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	12

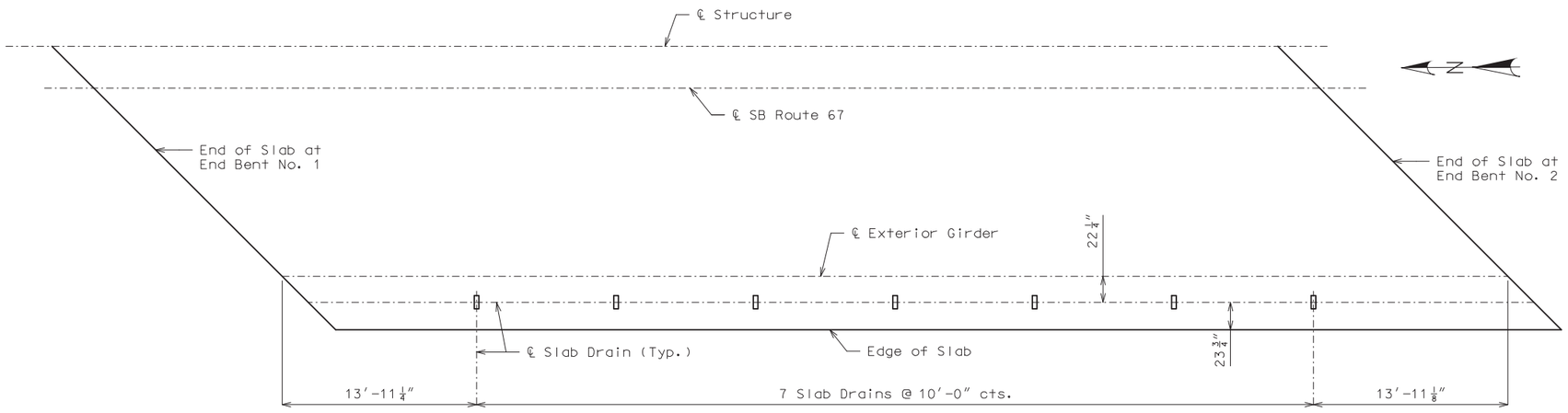
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

DESCRIPTION	DATE	REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

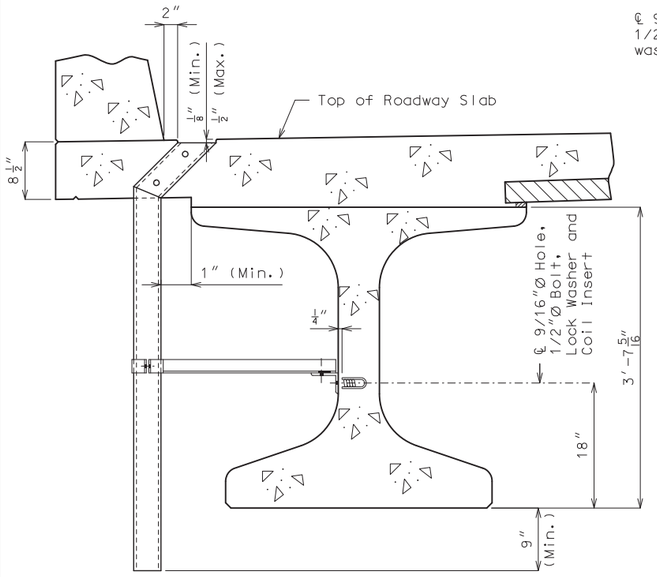
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

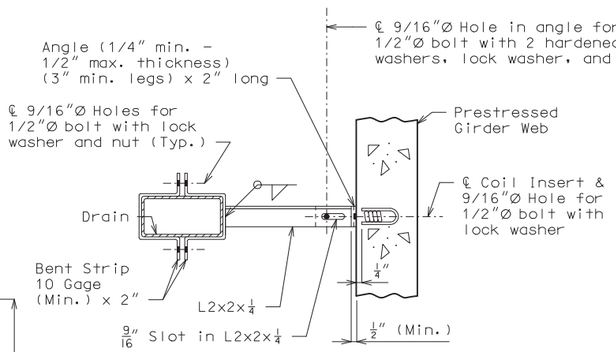


PART PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS

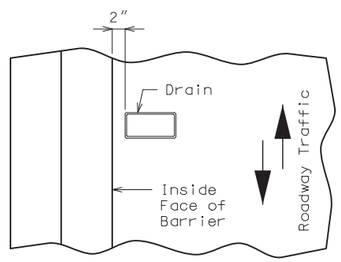
(Right side shown, left side similar)
Note: Longitudinal dimensions are horizontal.



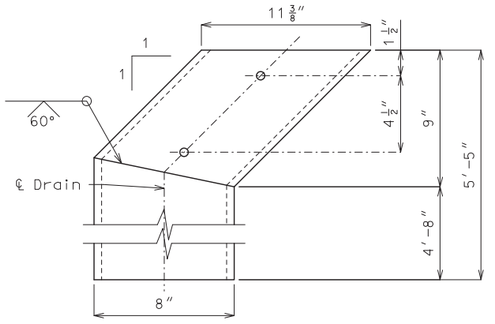
PART SECTION NEAR DRAIN



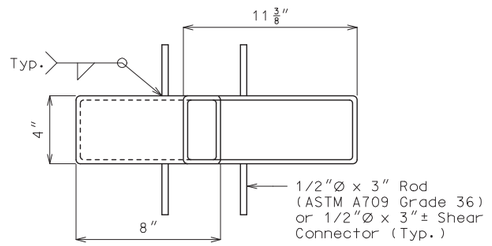
PART SECTION SHOWING BRACKET ASSEMBLY



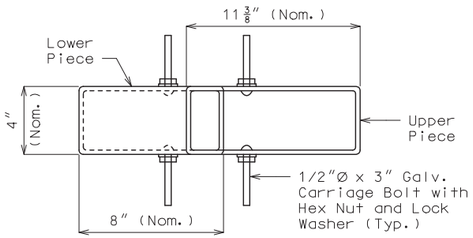
PART PLAN OF SLAB AT DRAIN



ELEVATION OF DRAIN



PLAN OF STEEL DRAIN OPTION



PLAN OF FRP DRAIN OPTION

SLAB DRAINS

General Notes:

Contractor shall have the option to construct either steel or FRP slab drains. All drains shall be of same type.

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Locate drains in slab by dimensions shown in Part Section Near Drain.

Reinforcing steel shall be shifted to clear drains.

The coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

All 1/2"Ø bolts shall be ASTM A307.

Shop drawings will not be required for the slab drains and the bracket assembly.

The coil insert required for the bracket assembly attachment shall be located on the prestressed girder shop drawings.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed girder fabricator.

Notes for Steel Drain:

Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Outside dimensions of drains are 8" x 4".

The drains shall be galvanized in accordance with ASTM A123.

Notes for FRP Drain:

Drains shall be machine filament-wound thermosetting resin tubing meeting the requirements of ASTM D2996 with the following exceptions:

Shape of drains shall be rectangular with outside nominal dimensions of 8" x 4".

Minimum reinforced wall thickness shall be 1/4 inch.

The resin used shall be ultraviolet (UV) resistant and/or have UV inhibitors mixed throughout. Drains may have an exterior coating for additional UV resistance.

The color of the slab drain shall be gray (Federal Standard 26373). The color shall be uniform throughout the resin and any coating used.

The combination of materials used in the manufacture of the drains shall be tested for UV resistance in accordance with ASTM D4329 Cycle A. The representative material shall withstand at least 500 hours of testing with only minor discoloration and without any physical deterioration. The contractor shall furnish the results of the required ultraviolet testing prior to acceptance of the slab drains.

At the contractor's option, drains may be field cut. The method of cutting FRP slab drain shall be as recommended by the manufacturer to ensure a smooth, chip free cut.

Both upper and lower drain pieces shall be rigidly connected to each other. Drain flow shall not be obstructed. Approval of the engineer is required.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED	
3/3/2023	
ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	13
COUNTY	
BUTLER	
JOB NO.	
J9P3751	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO.	
A9279	

REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

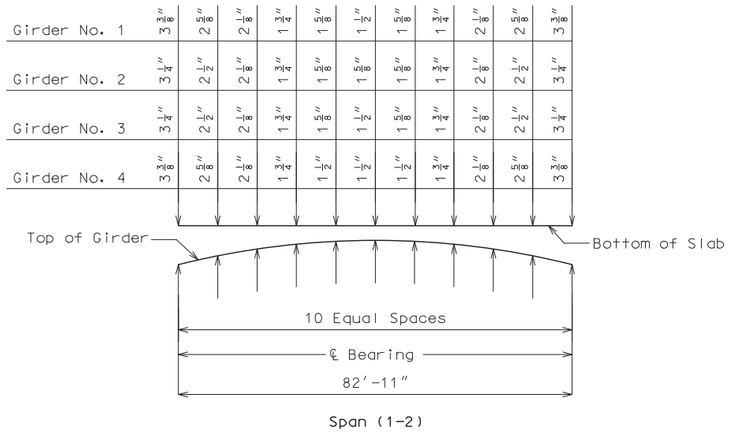
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harvell Ditch\A9279\B_A9279_013_J9P3751_Slab_Drain.dgn 10:08:16 AM 3/3/2023

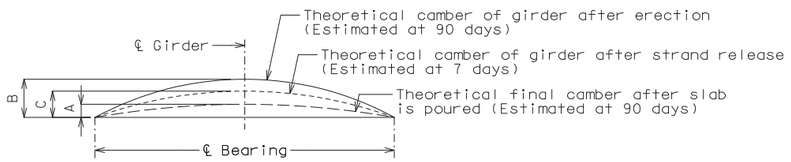


Span (1-2)

THEORETICAL SLAB HAUNCHING DIAGRAM

If girder camber is different from that shown in the camber diagram, in order to maintain minimum slab thickness, an adjustment of the slab haunches, an increase in slab thickness or a raise in grade uniformly throughout the structure shall be necessary. No payment will be made for additional labor or materials required for variation in haunching, slab thickness or grade adjustment.

Concrete in the slab haunches is included in the Estimated Quantities for Slab on Concrete NU-Girder.



Girder	Span (1-2)		
	A	B	C
Exterior	1 7/8"	3 1/4"	1 7/8"
Interior	1 5/8"		

GIRDER CAMBER DIAGRAM

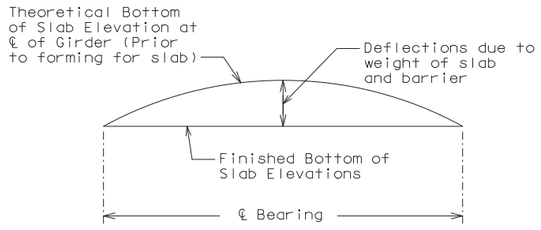
Conversion factors for girder camber (Estimated at 90 days):

0.1 pt. = 0.314 x 0.5 pt.
0.2 pt. = 0.593 x 0.5 pt.
0.3 pt. = 0.813 x 0.5 pt.
0.4 pt. = 0.952 x 0.5 pt.

Theoretical Bottom of Slab Elevations at Centerline of Girder (Prior to forming for slab) (Estimated at 90 days)

Girder Number	Span (1-2) (82'-11" ℄ Brg. - ℄ Brg.)										
	℄ Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ Brg.
1	307.92	307.96	307.98	307.99	307.98	307.96	307.93	307.89	307.84	307.78	307.69
2	308.12	308.16	308.17	308.17	308.16	308.14	308.12	308.08	308.03	307.97	307.89
3	307.97	308.01	308.02	308.02	308.01	307.99	307.97	307.93	307.88	307.82	307.74
4	307.71	307.75	307.77	307.78	307.77	307.75	307.72	307.68	307.63	307.57	307.48

Elevations are based on a constant slab thickness of 8 1/2" and include allowance for theoretical dead load deflections due to weight of slab (including precast panel) and barrier.



TYPICAL SLAB ELEVATIONS DIAGRAM

TBOS, HAUNCHING AND CAMBER

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_014_J9P3751_TBOS_Haunching_and_Camber.dgn 10:08:17 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

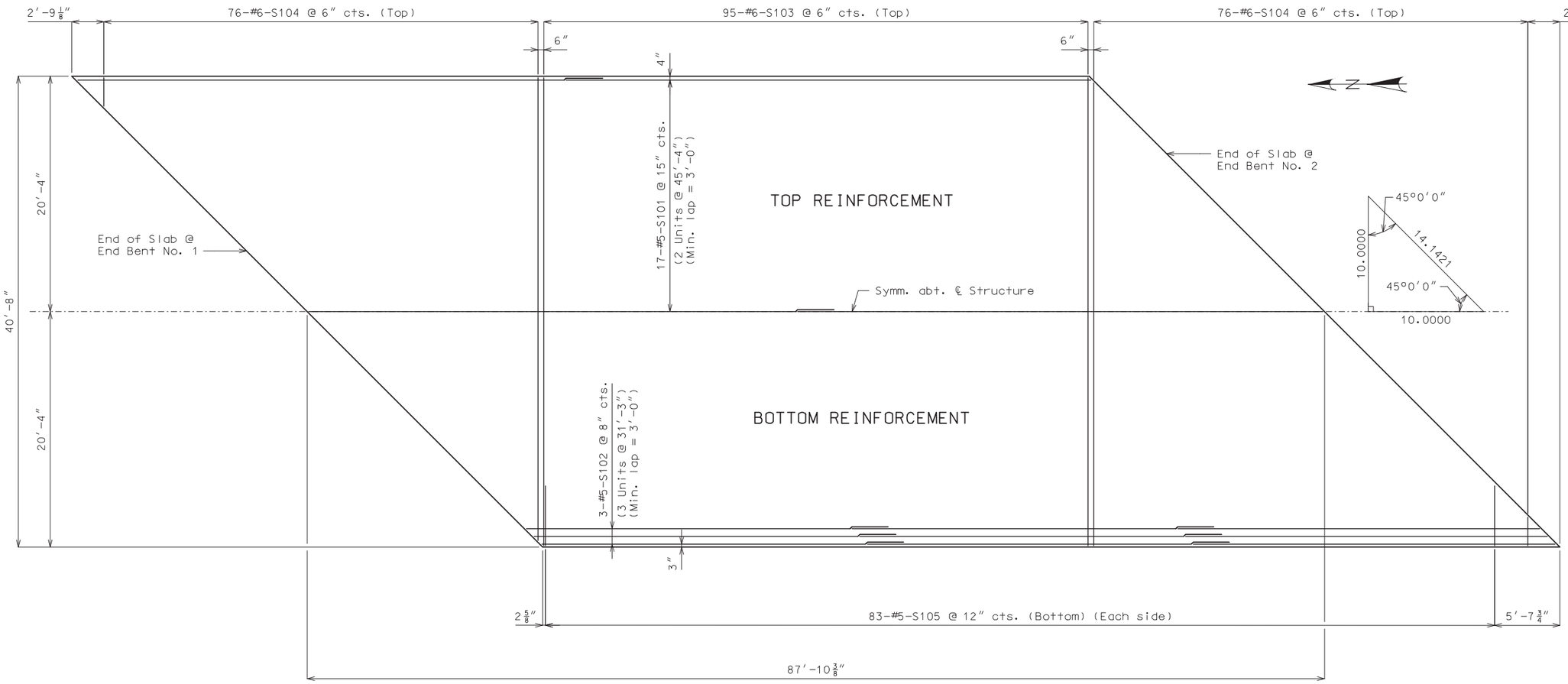
DATE PREPARED: 3/3/2023
ROUTE: 67 | STATE: MO
DISTRICT: BR | SHEET NO.: 14
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV. | DESCRIPTION | DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



PLAN OF SLAB SHOWING REINFORCEMENT

General Notes:

Longitudinal slab dimensions shown are horizontally.

For details of Precast Prestressed Panels, see Sheet No. 12.

For Theoretical Bottom of Slab Elevations, Girder Camber Diagram, and Theoretical Slab Haunching Diagram, see Sheet No. 14.

For Section Thru Slab, see Sheet No. 16.

For details and reinforcement of Type D Barrier not shown, see Sheets No. 17 and 18.

SLAB REINFORCEMENT DETAILS

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	15

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

DESCRIPTION	DATE

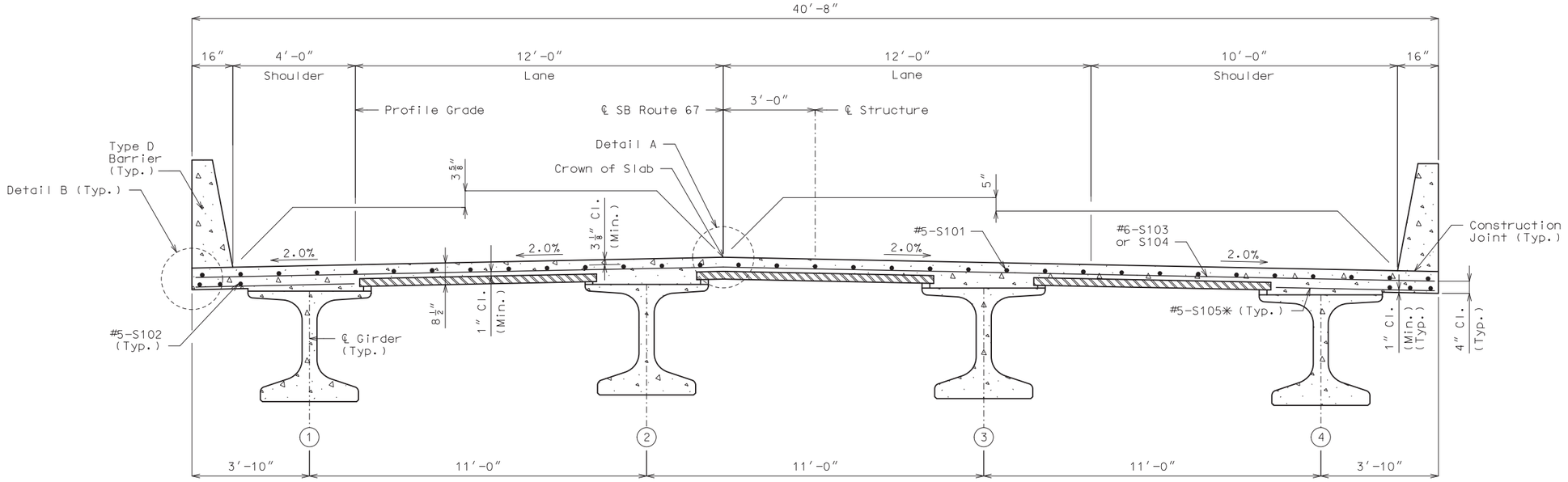
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

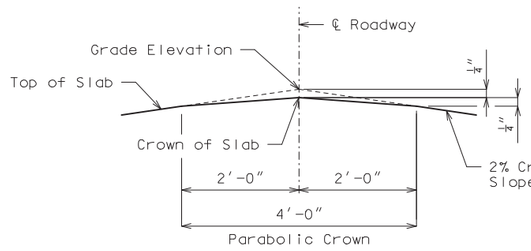
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

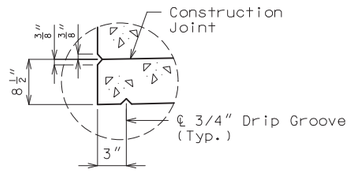


SECTION THRU SLAB

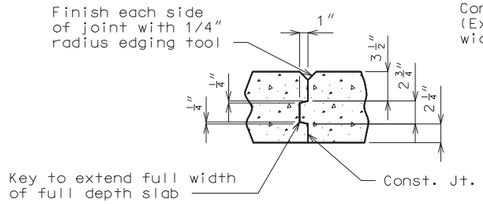
✳ Alternate bar shape available, see barrier sheets.



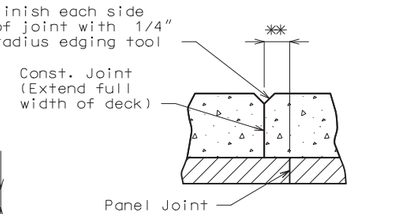
DETAIL A



DETAIL B



FULL DEPTH SLAB

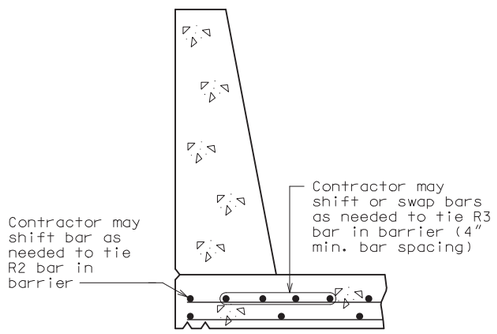


✳✳ Adjust the construction joint to a clearance of 6 inches minimum from the panel joint.

SLAB ON PANELS

SLAB CONSTRUCTION JOINT

(If needed)



OPTIONAL SHIFTING TOP BARS AT BARRIER

General Notes:

For details and reinforcement of Type D Barrier not shown, see Sheets No. 17 & 18.

For details of Precast Prestressed Panels, see Sheet No. 12.

For Theoretical Bottom of Slab Elevations, Girder Camber Diagram and Theoretical Slab Haunching Diagram, see Sheet No. 14.

For Plan of Slab Showing Reinforcement, see Sheet No. 15.

The contractor shall pour and satisfactorily finish the roadway slab at a rate of not less than 25 cubic yards per hour.

The contractor shall furnish an approved retarder to retard the set of the concrete to 2.5 hours and shall pour and satisfactorily finish the slab pours at the rate given.

The concrete diaphragm at the integral end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

DETAILS OF SLAB REINFORCING

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_016_J9P3751_Section_thru_Slab.dgn 10:08:19 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	16

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9279

DESCRIPTION

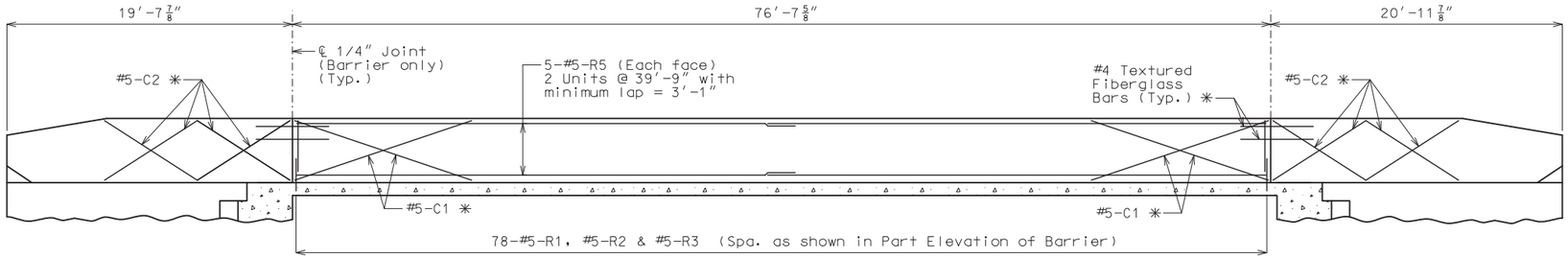
DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

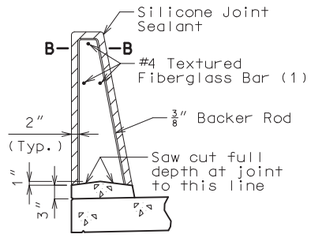
REV.



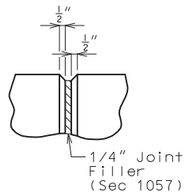
Span (1-2)

ELEVATION OF BARRIER

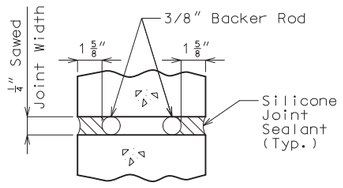
(Left barrier shown, right barrier similar by 180° rotation)
Longitudinal dimensions are horizontal.



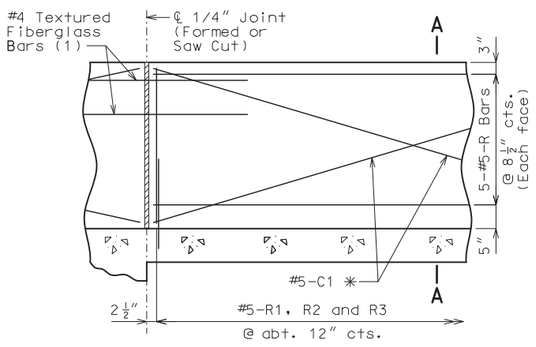
SECTION THRU SAW CUT JOINT



PART ELEVATION AT FORMED JOINT

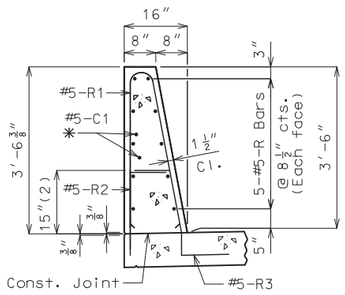


SECTION B-B



PART ELEVATION OF BARRIER

(1) Four feet long, centered on joint, slip-formed option only

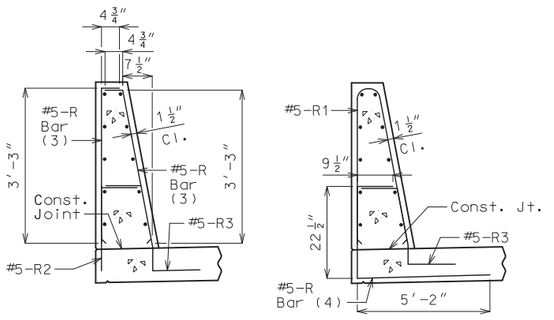


SECTION A-A

Use a minimum lap of 3′-1″ for #5 horizontal barrier bars.

The cross-sectional area above the slab is 3.52 square feet.

(2) To top of bar



R-BAR PERMISSIBLE ALTERNATE SHAPE

(3) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

(4) The R2 bar and #5 bottom transverse slab bar in cantilever (prestressed panels only) combination may be furnished as one bar as shown, at the contractor's option.

General Notes:

✳ Slip-formed option only.

Conventional forming or slip forming may be used. Saw cut joints may be used with conventional forming.

Top of barrier shall be built parallel to grade and barrier joints (except at end bents) normal to grade.

All exposed edges of barrier shall have either a 1/2-inch radius or a 3/8-inch bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for Type D Barrier per linear foot.

Concrete in barrier shall be Class B-1.

Measurement of barrier is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Type D Barrier.

Joint sealant and backer rods shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

For slip-formed option, both sides of barrier shall have a vertically broomed finish and the top shall have a transversely broomed finish.

TYPE D BARRIER

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_017_J9P3751_Barrier_Elevations.dgn 10:08:20 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	17

COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9279

DESCRIPTION	DATE

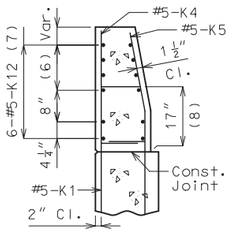
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

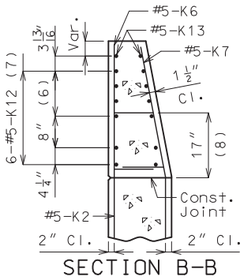
CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

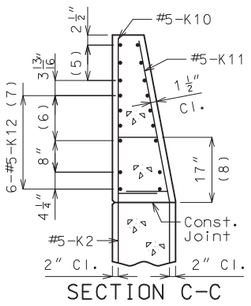
REV.



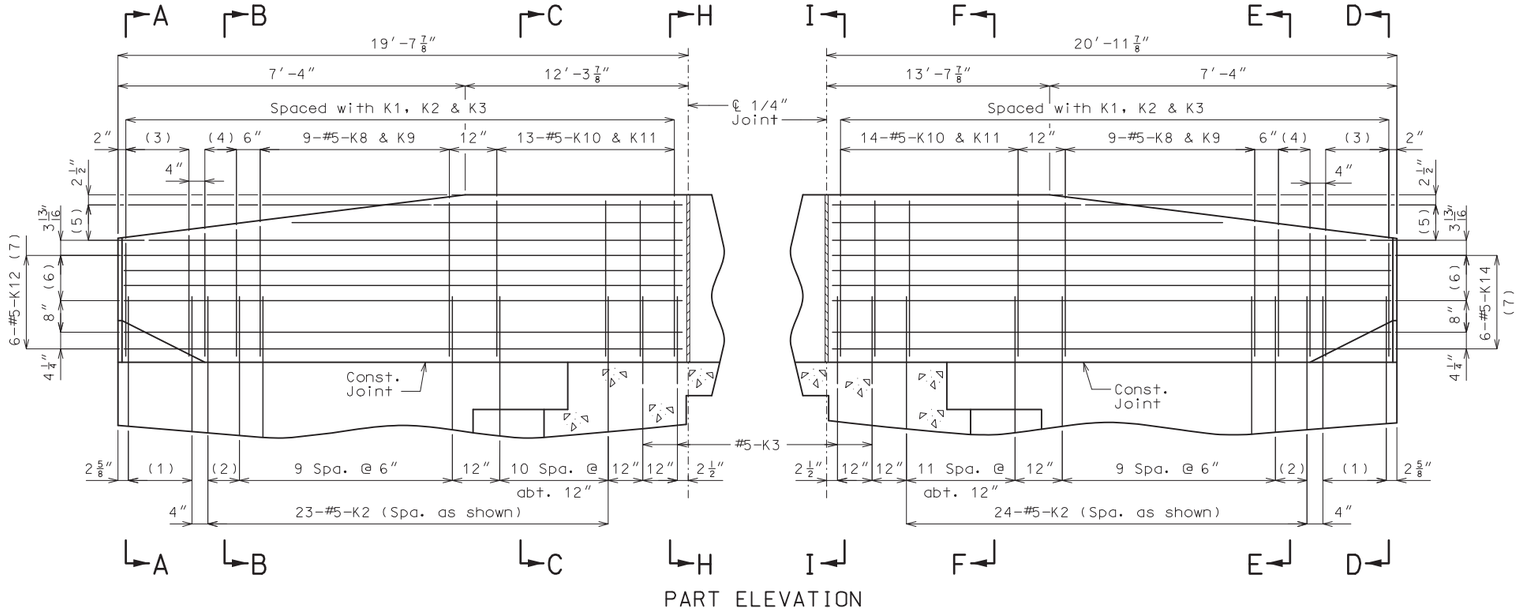
SECTION A-A



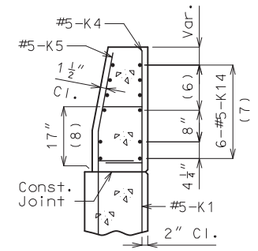
SECTION B-B



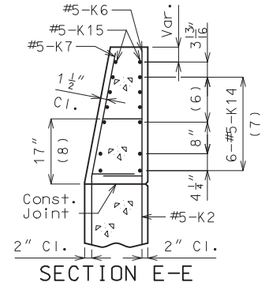
SECTION C-C



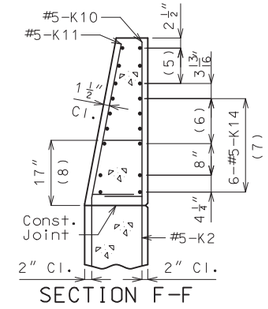
PART ELEVATION



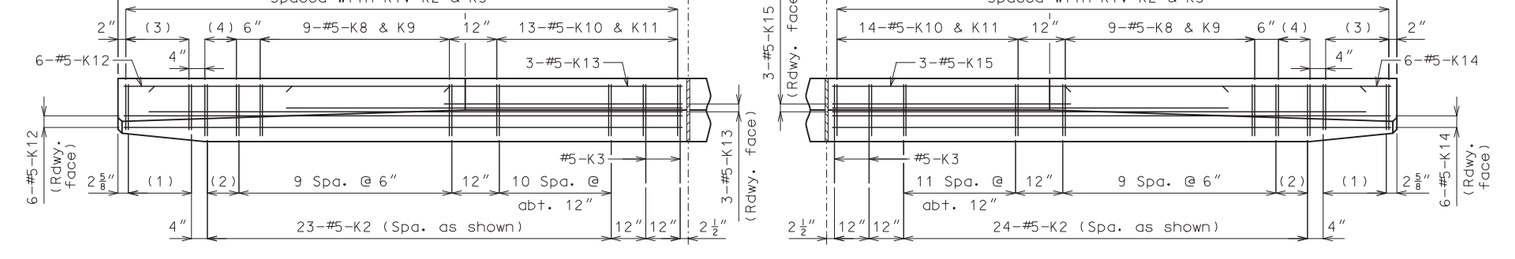
SECTION D-D



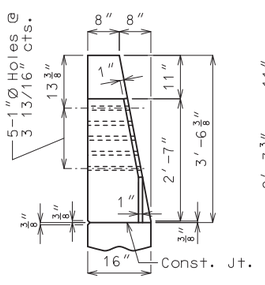
SECTION E-E



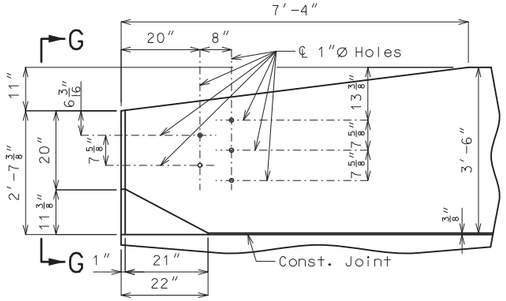
SECTION F-F



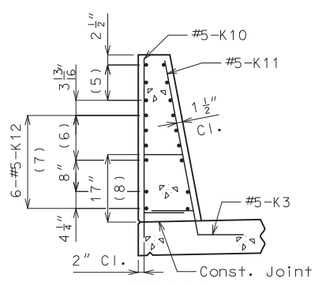
PART PLAN



ELEVATION G-G



ELEVATION



SECTION H-H

(1) 5-#5-K1 @ 4" cts.

(2) 2 spaces @ 4"

(3) 5-#5-K4 & K5

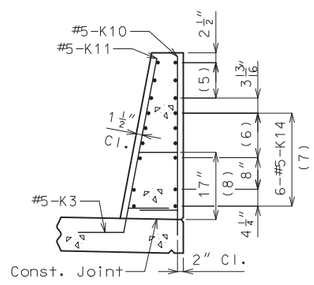
(4) 3-#5-K6 & K7

(5) 3-#5-K13 or K15 @ 4½" cts., each face

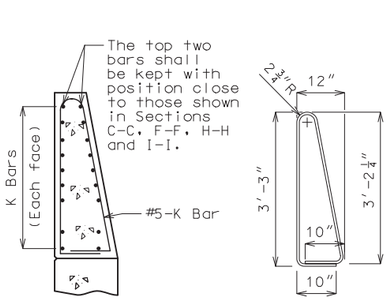
(6) 3 spaces @ 3 13/16"

(7) Spaced as shown, each face

(8) To top of bar



SECTION I-I



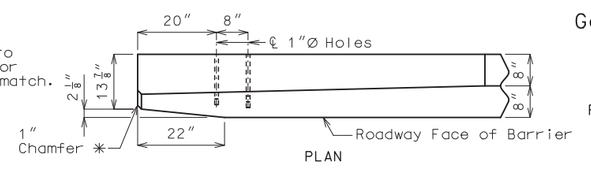
K10-K11 BAR PERMISSIBLE ALTERNATE SHAPE

(Other K bars not shown for clarity)

The K10-K11 bar combination may be furnished as one bar as shown, at the contractor's option.

All dimensions are out to out.

✳ Transition to zero at Type A curb for gutter lines to match.



PLAN

DETAILS OF GUARD RAIL ATTACHMENT

General Notes:

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Type D Barrier.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2" except as shown for bars embedded into end bent.

TYPE D BARRIER AT END BENTS

(Left barrier shown, right barrier similar by 180° rotation)

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 18 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	18

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9279

DESCRIPTION	DATE

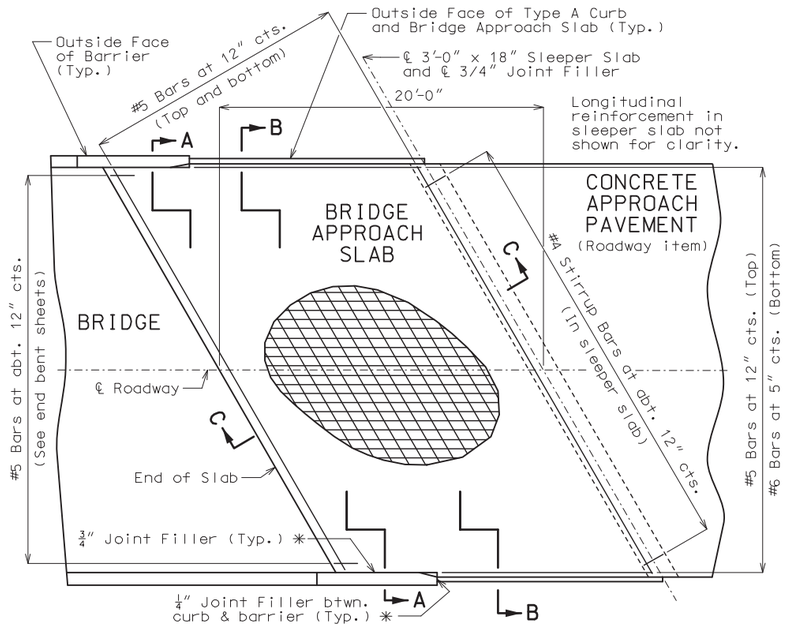
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

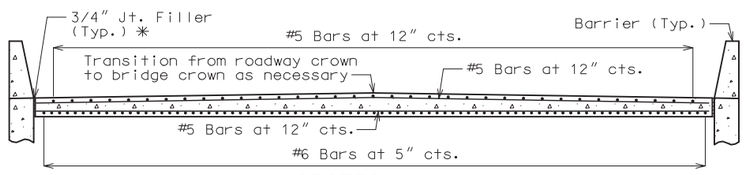
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

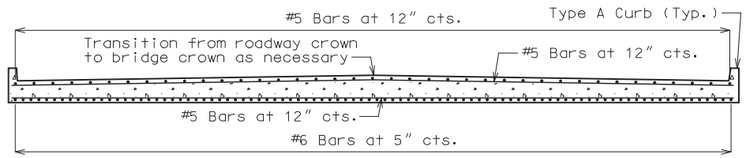
REV.



PART PLAN SHOWING REINFORCEMENT

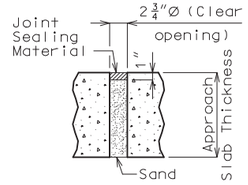


SECTION A-A



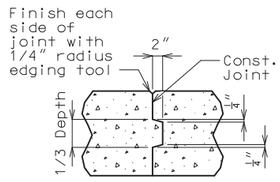
SECTION B-B

With the approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



UNDERSEAL ACCESS HOLE DETAIL

(If required)



CONSTRUCTION JOINT DETAIL

(If required)

General Notes:

All concrete for the bridge approach slab and sleeper slab shall be in accordance with Sec 503 (f'c = 4,000 psi).

The reinforcing steel in the bridge approach slab and the sleeper slab shall be epoxy coated Grade 60 with fy = 60,000 psi.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be continuous. The transverse reinforcing steel may be made continuous by providing a minimum lap splice of 29 inches for #5 bars and 44 inches for #6 bars, or by mechanical bar splice.

Mechanical bar splices shall be in accordance with Sec 710.

All joint filler shall be in accordance with Sec 1057 for preformed fiber expansion joint filler except as noted.

The contractor shall pour and satisfactorily finish the bridge slab before placing the bridge approach slab.

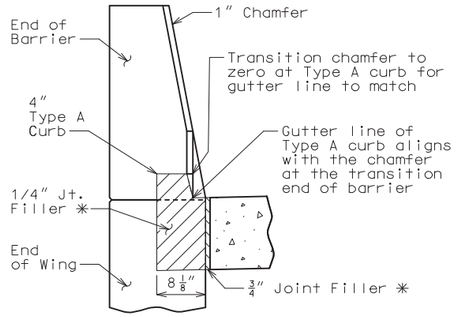
Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge slab.

For concrete approach pavement details, see roadway plans.

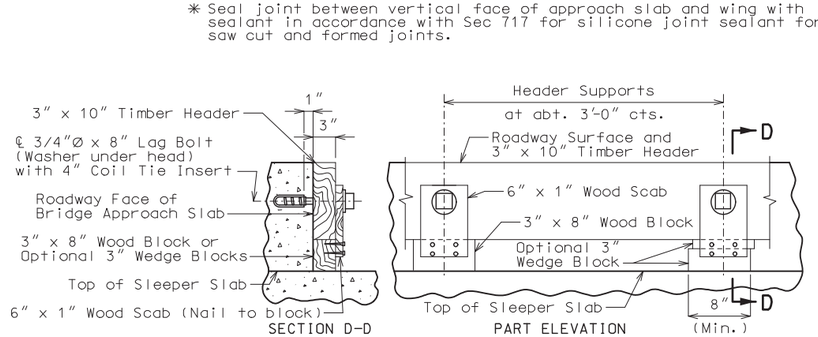
See Missouri Standard Plan 609.00 for details of Type A curb.

Payment for furnishing all materials, labor and excavation necessary to construct the approach slab, including the timber header, sleeper slab, underdrain, Type 5 aggregate base, joint filler and all other appurtenances and incidental work as shown on this sheet, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Major) per square yard.

* Seal joint between vertical face of approach slab and wing with sealant in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

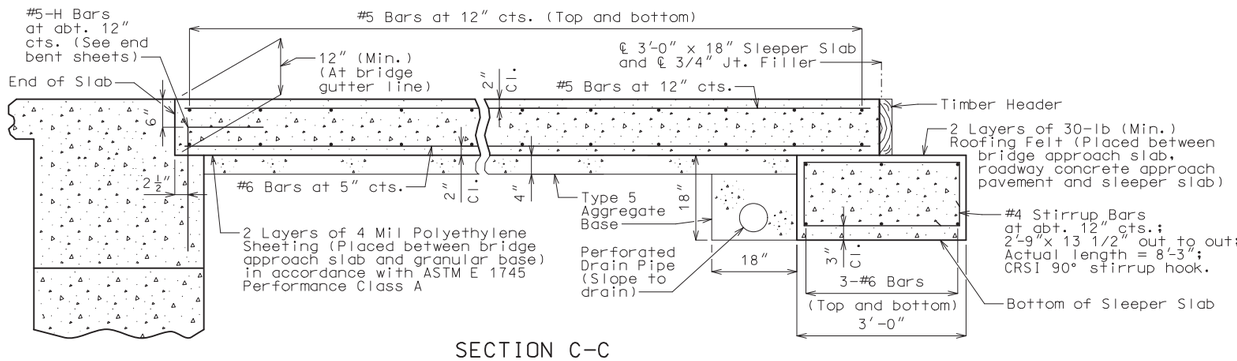


SECTION BETWEEN CURB AND BARRIER



DETAILS OF TIMBER HEADER

Remove timber header when concrete pavement is placed.



SECTION C-C

BRIDGE APPROACH SLAB (MAJOR)

JOSHUA D. JOLLIFF NUMBER PE-2006002824 PROFESSIONAL ENGINEER
STATE OF MISSOURI
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	19

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)
CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

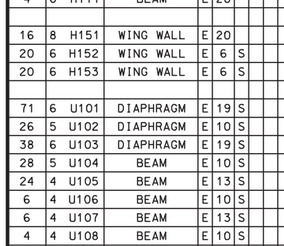
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_019_J9P3751_Approach_Slab.dgn 10:08:22 AM 3/3/2023

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			END BENT 1																									
10	6	F100	WING BRACE	E	23					2	3.000	4	6.750	14.000		13.000		5.250		2	1.000	10.250		8	0	7	9	117
10	6	F101	WING BRACE	E	15						14.000	9	6.000	2	3.000	10.250		2	1.000	13.000		5.250		12	11	12	10	193
4	6	F102	DIAPHRAGM	E	23					5	2.250	5	1.000							3	8.000	3	8.000	10	4	10	3	62
4	6	F103	DIAPHRAGM	E	21					8	7.500	5	1.000							6	1.250	6	1.250	13	9	13	6	82
38	5	H101	DIAPHRAGM	E	19					2	0.000	15.000												3	3	3	2	126
4	6	H102	DIAPHRAGM	E	20					57	1.000													57	1	57	1	343
4	8	H103	DIAPHRAGM	E	20					57	1.000													57	1	57	1	610
4	5	H104	DIAPHRAGM	E	23						15.250	3	3.000	15.250		10.750		10.750		10.750		10.750		5	10	5	9	24
9	6	H105	DIAPHRAGM	E	20					14	0.000													14	0	14	0	190
3	6	H106	DIAPHRAGM	E	20					10	8.000													10	8	10	8	49
6	6	H107	DIAPHRAGM	E	20					4	5.000													4	5	4	5	40
2	6	H108	DIAPHRAGM	E	20					2	9.000													2	9	2	9	9
8	8	H109	BEAM	E	20					57	1.000													57	1	57	1	1220
4	6	H110	BEAM	E	20					57	1.000													57	1	57	1	343
4	6	H111	BEAM	E	20					24	10.000													24	10	24	10	150
16	8	H151	WING WALL	E	20					16	6.000													16	6	16	6	705
20	6	H152	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
20	6	H153	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
71	6	U101	DIAPHRAGM	E	19	S				3	5.000	7	0.000											10	5	10	4	1102
26	5	U102	DIAPHRAGM	E	10	S						4	2.750	4	7.000									13	1	12	10	349
38	6	U103	DIAPHRAGM	E	19	S				3	0.000	5	3.000											8	3	8	2	467
28	5	U104	BEAM	E	10	S						6	3.000	5	3.000									17	9	17	7	514
24	4	U105	BEAM	E	13	S				5	3.000	2	8.000	5	3.000	2	8.000							16	7	16	4	262
6	4	U106	BEAM	E	10	S						2	8.000	5	3.000									10	7	10	5	42
6	4	U107	BEAM	E	13	S				5	3.000	2	11.000	5	3.000	2	11.000							17	1	16	10	68
4	4	U108	BEAM	E	10	S						2	11.000	5	3.000									11	1	10	11	30
12	5	U109	DIAPHRAGM	E	10	S						4	1.750	4	7.000									12	11	12	8	159
28	6	V101	DIAPHRAGM	E	20					2	11.000													2	11	2	11	123
20	5	V102	BEAM	E	20					6	3.000													6	3	6	3	131
30	6	V151	WING WALL	E	20					7	2.000													7	2	7	2	323
30	6	V152	WING WALL	E	20					7	5.000													7	5	7	5	335
			END BENT 2																									
10	6	F200	WING BRACE	E	23					2	3.000	4	6.750	14.000		13.000		5.250		2	1.000	10.250		8	0	7	9	117
10	6	F201	WING BRACE	E	15						14.000	9	6.000	2	3.000	10.250		2	1.000	13.000		5.250		12	11	12	10	193
4	6	F202	DIAPHRAGM	E	23					5	2.250	5	1.000							3	8.000	3	8.000	10	4	10	3	62
4	6	F203	DIAPHRAGM	E	21					8	7.500	5	1.000							6	1.250	6	1.250	13	9	13	6	82
38	5	H201	DIAPHRAGM	E	19					2	0.000	15.000												3	3	3	2	126
4	6	H202	DIAPHRAGM	E	20					57	1.000													57	1	57	1	343
4	8	H203	DIAPHRAGM	E	20					57	1.000													57	1	57	1	610
4	5	H204	DIAPHRAGM	E	23						15.250	3	3.000	15.250		10.750		10.750		10.750		10.750		5	10	5	9	24
9	6	H205	DIAPHRAGM	E	20					14	0.000													14	0	14	0	190
3	6	H206	DIAPHRAGM	E	20					10	8.000													10	8	10	8	49
6	6	H207	DIAPHRAGM	E	20					4	5.000													4	5	4	5	40
2	6	H208	DIAPHRAGM	E	20					2	9.000													2	9	2	9	9
8	8	H209	BEAM	E	20					57	1.000													57	1	57	1	1220
4	6	H210	BEAM	E	20					57	1.000													57	1	57	1	343
4	6	H211	BEAM	E	20					24	9.000													24	9	24	9	149

BILL OF REINFORCING STEEL

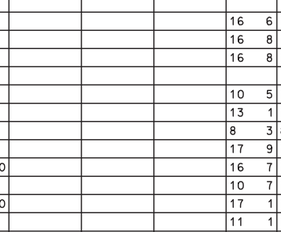
NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
16	8	H251	WING WALL	E	20					16	6.000													16	6	16	6	705
20	6	H252	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
20	6	H253	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
71	6	U201	DIAPHRAGM	E	19	S				3	5.000	7	0.000											10	5	10	4	1102
26	5	U202	DIAPHRAGM	E	10	S						4	3.000	4	7.000									13	1	12	11	351
38	6	U203	DIAPHRAGM	E	19	S				3	0.000	5	3.000											8	3	8	2	467
28	5	U204	BEAM	E	10	S						6	2.750	5	3.000									17	9	17	6	512
24	4	U205	BEAM	E	13	S				5	3.000	2	8.000	5	3.000	2	8.000							16	7	16	4	262
6	4	U206	BEAM	E	10	S						2	8.000	5	3.000									10	7	10	5	42
6	4	U207	BEAM	E	13	S				5	3.000	2	11.000	5	3.000	2	11.000							17	1	16	10	68
4	4	U208	BEAM	E	10	S						2	11.000	5	3.000									11	1	10	11	30
12	5	U209	DIAPHRAGM	E	10	S						4	1.500	4	7.000									12	10	12	8	159
28	6	V201	DIAPHRAGM	E	20					2	11.000													2	11	2	11	123
20	5	V202	BEAM	E	20					6	2.000													6	2	6	2	129
30	6	V251	WING WALL	E	20					7	4.000													7	4	7	4	331
30	6	V252	WING WALL	E	20					7	1.000													7	1	7	1	320
			SLAB																									
66	5	S101	SLAB	E	20					45	4.000													45	4	45	4	3121
18	5	S102	SLAB	E	20					31	3.000													31	3	31	3	587
95	6	S103	SLAB	E	20					40	5.000													40	5	40	5	5768
152	6	S104	SLAB	E	20			V	2	39	11.500													40	0	40	0	
			INCR. = 0.5'							2	5.500													2	6	2	6	4852
166	5	S105	SLAB	E	20					5	2.000													5	2	5	2	895
			TYPE D BARRIER																									
156	5	R1	BARRIER	E	26					3	3.000	5.500		3	0.750					3	3.000	6.750		6	11	6	8	1085
156	5	R2	BARRIER	E	19	S					20.500	9.500												2	6	2	5	394
156	5	R3	BARRIER	E	27	S						9.500		15.250		5.000		12.000		15.000		3.000		3	6	3	4	543
40	5	R5	BARRIER	E	20					39	9.000													39	9	39	9	1659
20	5	K1	BARRIER	E	27	S				3	8.000	9.250		5.250		3	2.750			5.250		1.000		8	2	8	0	167
94	5	K2	BARRIER	E	27	S				3	8.000	9.250		14.500		2	5.750			14.250		2.750		8	2	8	0	785
8	5	K3	BARRIER	E	27	S					22.500	9.250		14.750		7.750		12.000		14.500		2.750		5	7	5	3	44
20	5	K4	BARRIER	E	19	S		V	4	2	4.250	10.000												3	3	3	1	
			INCR. = 0.5"							2	6.250	10.000												3	5	3	3	67
20	5	K5	BARRIER	E	14	S		V	4		8.250	9.500		18.500						4.000		18.000		3	1	2	11	
			INCR. = 0.5"								8.250	9.500		20.500						4.500		20.000		3	3	3	1	63
12	5	K6	BARRIER	E	19	S		V	4	2	6.750	10.000												3	5	3	4	
			INCR. = 0.5"							2	7.750	10.000												3	6	3	5	43
12	5	K7	BARRIER	E	21	S		V	4	2	6.750	10.000								2	6.000	6.250		3	5	3	4	
			INCR. = 0.5"							2	7.750	10.000								2	7.000	6.500		3	6	3	5	43
36	5	K8	BARRIER	E	19	S		V	4	2	8.500	10.000												3	7	3	6	
			INCR. = 0.75"							3	2.500	10.000												4	1	4	0	141
36	5	K9	BARRIER	E	21	S		V	4	2	8.500	10.000								2	7.750	6.750		3	7	3	6	
			INCR. = 0.75"							3	2.500	10.000								3	1.750	7.750		4	1	4	0	141
54	5	K10	BARRIER	E	19	S				3	3.000	10.000												4	1	4	0	226
54	5	K11	BARRIER	E	21	S				3	3.000	10.000								3	2.250	7.750		4	1	4	0	226
24	5	K12	BARRIER	E	20					19	4.000													19	4	19	4	484
12	5	K13	BARRIER	E	20			V	4	18	7.000													18	7	18	7	
			INCR. = 3'							12	7.000													12	7	12	7	196
24	5	K14	BARRIER	E	20					20	8.000													20	8	20	8	518



90° STIRRUP 135° STIRRUP

STIRRUP HOOK DIMENSIONS					
GRADES 40 - 50 - 60 KSI					
BAR SIZE	D (IN.)	90° HOOK		135° HOOK	
		HOOK A OR G		HOOK A OR G	APPROX. H
#4	2"	4 1/2"		4 1/2"	3"
#5	2 1/2"	6"		5 1/2"	3 3/4"
#6	4 1/2"	12"		8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS		90° HOOKS
		A OR G	J	A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.

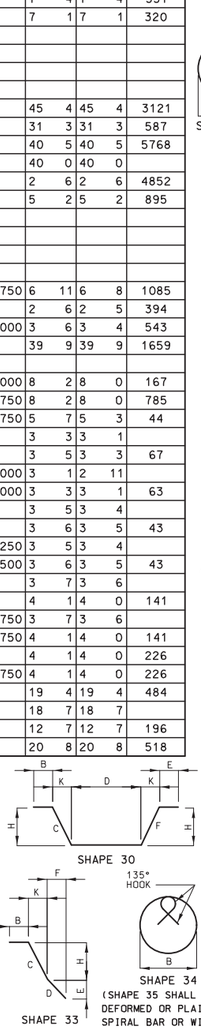
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

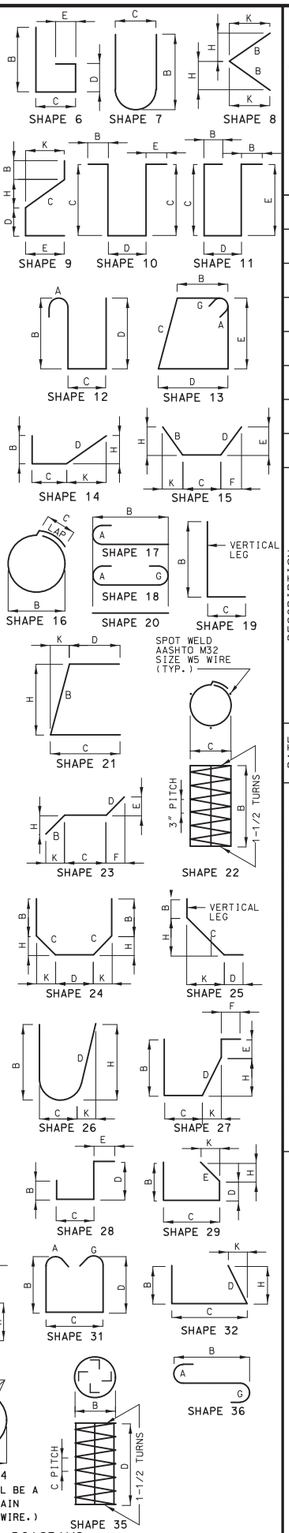
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.

REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.





BENDING DIAGRAMS

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 20
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9279

REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

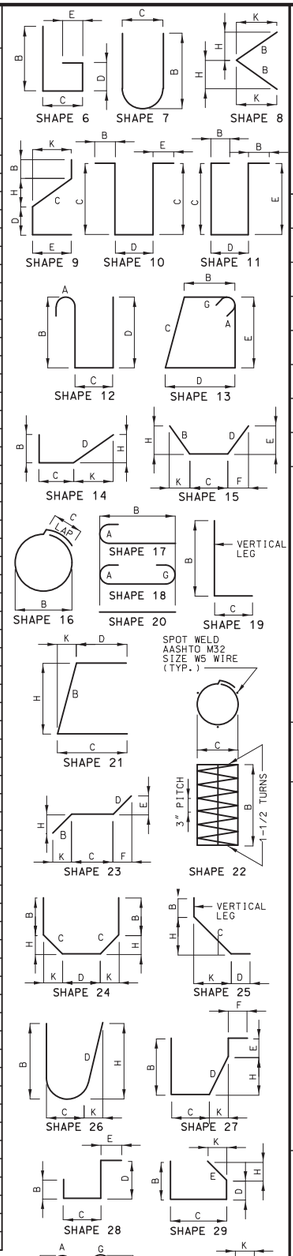
CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

BILL OF REINFORCING STEEL

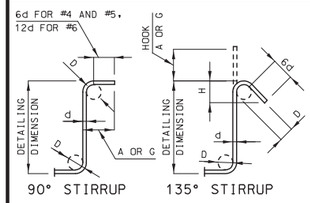
NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
12	5	K15	BARRIER	E	20			V	4	19	11.000													19	11	19	11	
			INCR. = 3'							13	11.000													13	11	13	11	212
8	5	C1	SLIP FORM	E	20					12	0.000													12	0	12	0	101
16	5	C2	SLIP FORM	E	20					8	0.000													8	0	8	0	134
			TOTALS																									
	4			E																								804
	5			E																								14479
	6			E																								20464
	8			E																								5070
			TOTAL	E																								40817
			SLAB ON CONCRETE NU-GIRDER																									
	4			E																								804
	5			E																								7207
	6			E																								20464
	8			E																								5070
			TOTAL	E																								33545
			TYPE D BARRIER																									
	5			E																								7037
			TOTAL	E																								7037
			SLIP FORM OPTION																									
	5			E																								235
			TOTAL	E																								235

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.

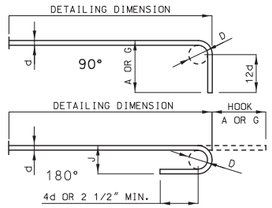


BENDING DIAGRAMS



STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK HOOK A OR G	135° HOOK HOOK A OR G	135° HOOK APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.

NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.

REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	21

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9279

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

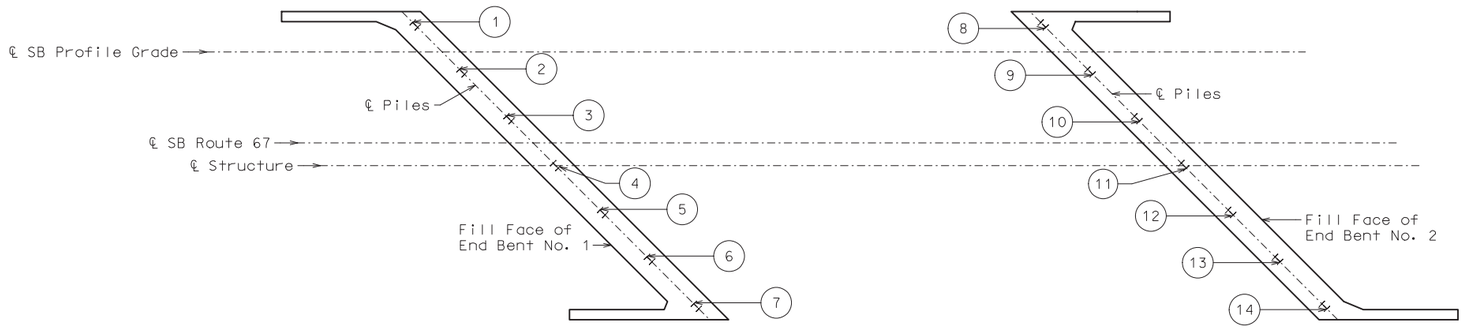
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9279\B_A9279_021_J9P3751_Bill_of_Reinforcing2.dgn 10:08:24 AM 3/3/2023



PART PLAN SHOWING PILE NUMBERING FOR RECORDING AS-BUILT PILE DATA

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent No. 1
1			
2			
3			
4			
5			
6			
7			

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent No. 2
8			
9			
10			
11			
12			
13			
14			

Note:
Indicate in remarks column:
A. Pile type and grade
B. Batter
C. Driven to practical refusal

This sheet to be completed by MoDOT construction personnel.

AS-BUILT PILE DATA

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

JOSHUA D. JOLLIFF NUMBER PE-2006002824 STATE OF MISSOURI PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 22
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9279

DESCRIPTION | DATE | REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-201

CLIENT MoDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri
DATE STARTED 12/7/21 **COMPLETED** 12/7/21
GROUND ELEVATION 303.7 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR Smith & Co. **DRILLED BY** Smith & Co
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger and Mud Rotary (CME-750)
AT TIME OF DRILLING ---
LOGGED BY NB **CHECKED BY** CM
AT END OF DRILLING ---
STATION 758+75 **OFFSET** 26' RT
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL - 6 inches										
		(CL) SANDY LEAN CLAY: Light gray, moist, stiff to hard	SPT SS1	100	5-6-7 (13)			4				45
			SPT SS2	72	6-11-15 (26)			10				52
			SPT SS3	94	9-17-17 (34)			6				28
10			SPT SS4	89	5-6-8 (14)			10				17
		(SP) SAND: Gray to grayish brown, moist, very loose to medium dense	SPT SS5	83	4-7-4 (11)			24				24
20			SPT SS6	89	1-2-1 (3)			21				16
			SPT SS7	44	5-2-2 (4)			23				31
30			SPT SS8	67	5-10-9 (19)			20				22
			SPT SS9	67	8-9-7 (16)			23				28
40			SPT SS10	61	9-12-14 (26)			21				21
			SPT SS11	61	7-7-12 (19)			22				23
50			SPT SS12	0	8-5-5 (10)							

(Continued Next Page)

B-201

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-201

CLIENT MoDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SP) SAND: Gray to grayish brown, moist, very loose to medium dense *(continued)*										
		(SP) GRAVELLY SAND: Graysih brown, moist, medium dense	SPT SS13	56	9-8-8 (16)			16				31
60			SPT SS14	39	10-11-9 (20)			14				35
			SPT SS15	6	13-10-9 (19)			15				
70			SPT SS16	39	9-10-11 (21)			13				
		(SP) SAND: Grayish brown, moist, medium dense	SPT SS17	44	11-11-12 (23)			20				30
80		(SP) GRAVELLY SAND: Graysih brown, moist, very dense	SPT SS18	83	12-50/1"			13				
		Refusal at 80.1 feet. Bottom of borehole at 80.1 feet.										

B-201

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

JOSHUA D. JOLLIFF NUMBER PE-2006002824 STATE OF MISSOURI PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 23
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9279

DESCRIPTION | DATE | REV.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-202

CLIENT McDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri
DATE STARTED 12/14/21 **COMPLETED** 12/15/21
GROUND ELEVATION 304.8 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR Smith & Co. **DRILLED BY** Smith & Co
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger and Mud Rotary (CME-750)
▽ **AT TIME OF DRILLING** 19.50 ft / Elev 285.30 ft
LOGGED BY NB **CHECKED BY** CM
AT END OF DRILLING ---
STATION 759+88 **OFFSET** 44' RT
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL - 6 inches										
		(CL) SANDY LEAN CLAY: Grayish brown, moist, soft to medium stiff	SPT SS1	61	1-2-3 (5)			15				57
			SPT SS2	100	1-1-1 (2)			17				61
			SPT SS3	100	1-3-5 (8)			16				55
10		(SP-SC) SAND WITH CLAY: Light brownish gray to gray, moist, medium dense	SPT SS4	92	3-5-7 (12)			13				38
			SPT SS5	89	5-9-12 (21)			19				39
20		▽	SPT SS6	86	5-8-10 (18)			19				37
		(SP) SAND: Gray, moist, loose to medium dense	SPT SS7	44	1-2-3 (5)			20				60
30			SPT SS8	56	5-6-7 (13)			19				43
			SPT SS9	61	8-8-8 (16)			20				51
40		(SP) GRAVELLY SAND: Gray, moist, medium dense to dense	SPT SS10	67	5-8-12 (20)			19				39
			SPT SS11	64	4-3-10 (18)			20				24
50			SPT SS12	58	6-9-8 (17)			19				24

(Continued Next Page)

B-202

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-202

CLIENT McDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SP) GRAVELLY SAND: Gray, moist, medium dense to dense *(continued)*										
			SPT SS13	0	4-6-6 (12)			18				21
60			SPT SS14	72	6-9-12 (21)			15				24
			SPT SS15	100	5-10-11 (21)			19				19
70			SPT SS16	61	8-13-12 (25)			17				24
			SPT SS17	72	8-9-15 (24)			20				23
80			SPT SS18	64	11-15-17 (32)			17				21
		Refusal at 83.0 feet. Bottom of borehole at 83.0 feet.										

B-202

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Detailed Oct. 2022
Checked Oct. 2022

Note: This drawing is not to scale. Follow dimensions.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 24
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9279

DESCRIPTION | DATE | REV.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

SEC./SUR. 28 TWP. 23N RGE. 5E

Notes:

Roadway fill shall be completed to the final roadway section and up to the elevation of the bottom of the concrete beam within the limits of the structure and for not less than 25 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

Hydrologic Data
Drainage Area = 9.3 mi²
Design Flood Frequency = 50 years
Design Flood Discharge = 1,060 cfs
Design Flood (D.F.) Elevation = 302.8
Base Flood (100-year)
Base Flood Elevation = 303.3
Base Flood Discharge = 1,210 cfs
Estimated Backwater = 0.1 ft
Average Velocity thru Opening = 2.8 ft/s
Freeboard (50-year)
Freeboard = 1.2 ft
Roadway Overtopping
Overtopping Flood Discharge = N/A
Overtopping Flood Frequency = >500 years
500 Year Flood Elevation = 304.5

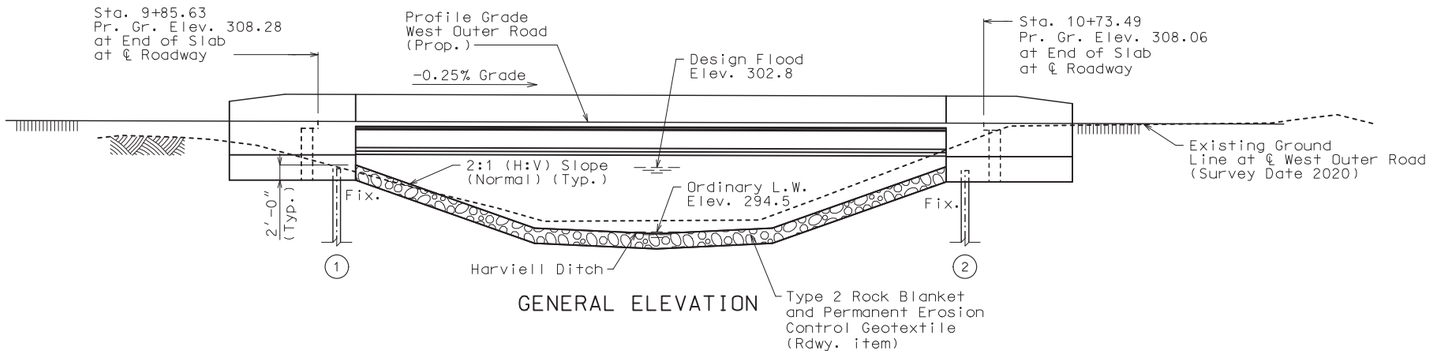
⊕ Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

The locations of all subsurface borings for this structure are shown on the plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, are shown on Sheet(s) No. 23 & 24 and may be included in the Electronic Bridge Deliverables. They will also be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.

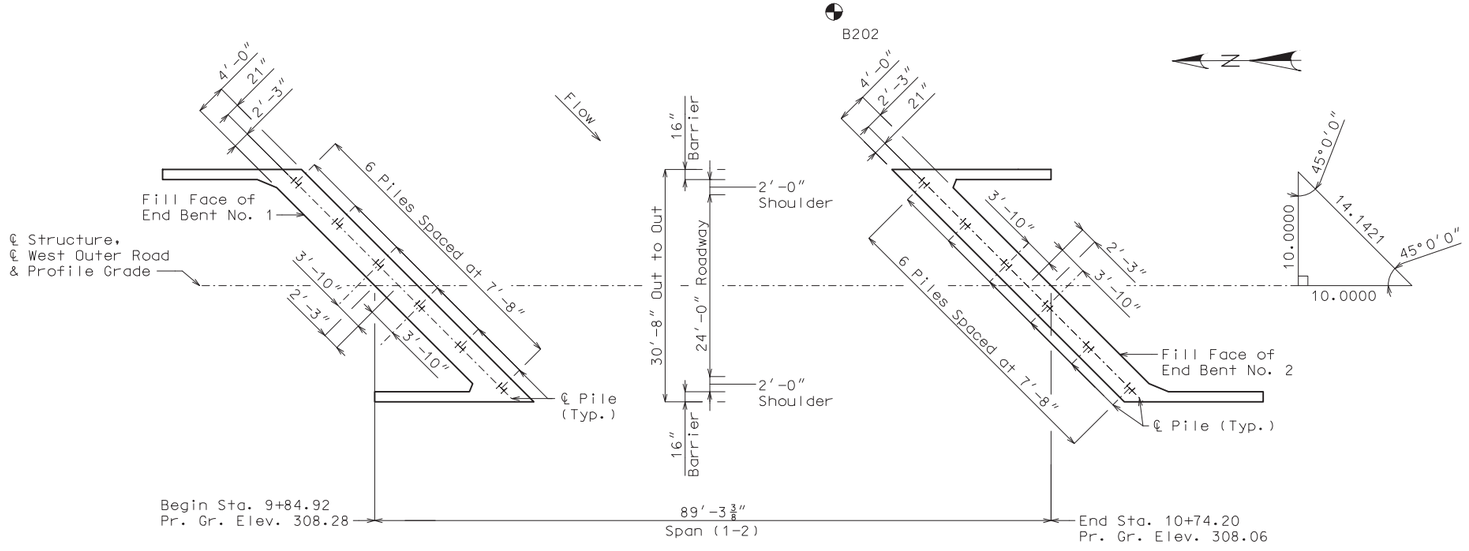
(82.9′) PRESTRESSED CONCRETE NU-GIRDER SPAN



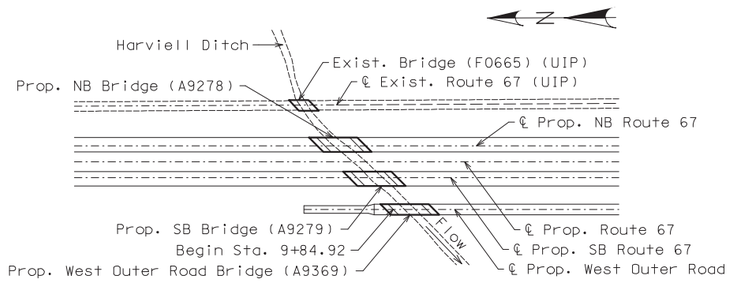
GENERAL ELEVATION

B201

B202



PLAN



LOCATION SKETCH

General Notes:

Longitudinal dimensions are measured horizontal.

For General Notes, Estimated Quantities and Foundation Data see Sheet No. 2.

B.M. #32
N: 282085.74
E: 814254.75
Sta. 719+83.75 Exist. Rte 67
Elev. 308.27
Chisled "□" on SW corner of west barrier curb on bridge F0665

Control Point #129
N: 281264.97
E: 814315.18
Sta. 728+04.49 Exist. Rte 67
Elev. 302.52
5/8" rebar with MoDOT cap

GENERAL PLAN AND ELEVATION

BRIDGE: ROUTE 67 WEST OUTER ROAD OVER HARVIELL DITCH

ROUTE 67 WEST OUTER ROAD FROM COUNTY ROAD 352
ABOUT 3.2 MILES NORTH OF ROUTE 142
BEGINNING STATION 9+84.92 (℄ WEST OUTER ROAD ROUTE 67)

Designed Jan. 2023
Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	1

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9369

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_001_J9P3751_General_Plan_and_Elevation.dgn 10:25:03 AM 3/3/2023

General Notes:

Design Specifications:

2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)
2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design (2nd Ed.) and 2014 Interim Revisions (Seismic Details)
Seismic Design Category = C
Design earthquake response spectral acceleration coefficient at 1.0 second period, S_{D1} = 0.34
Acceleration Coefficient (effective peak ground acceleration coefficient), A_s = 0.37

Design Loading:

Vehicular = HL-93
Future Wearing Surface = 35 lb/sf
Earth = 120 lb/cf
Equivalent Fluid Pressure = 45 lb/cf (Min.)
Superstructure: Non-composite for dead load. Composite for live load.

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-2 Concrete (Superstructure, except Prestressed Girders and Barrier)	f'c = 4,000 psi
Class B-1 Concrete (Barrier)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Steel HP Pile (ASTM A709 Grade 50S)	fy = 50,000 psi

For precast prestressed panel stresses, see Sheet No. 12.

For prestressed girder stresses, see Sheets No. 10 & 11.

Neoprene Pads:

Neoprene bearing pads shall be 60 durometer and shall be in accordance with Sec 716.

Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. Traffic to be maintained on other routes during construction. See roadway plans for traffic control.

Miscellaneous:

MoDOT Construction personnel will indicate the type of joint filler option used under the precast panels for this structure:

☐ Constant Joint Filler
☐ Variable Joint Filler

Estimated Quantities for Slab on Concrete NU-Girder

Item		Total
Class B-2 Concrete	cu. yard	126
Reinforcing Steel (Epoxy Coated)	pound	25,590

Notes:

The table of Estimated Quantities for Slab on Concrete NU-Girder represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard longitudinally from end of slab to end of slab and transversely from out to out of bridge slab (or with the horizontal dimensions as shown on the plan of slab). Payment for prestressed panels, conventional forms, all concrete and epoxy coated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

The Estimated Quantities for Slab on Concrete NU-Girder are based on skewed precast prestressed end panels.

Class B-2 Concrete quantity is based on minimum top flange thickness and minimum joint material thickness.

The prestressed panel quantities are not included in the table of Estimated Quantities for Slab on Concrete NU-Girder.

Estimated Quantities

Item		Substr.	Superstr.	Total
Class 1 Excavation	cu. yard	160		160
Bridge Approach Slab (Minor)	sq. yard		127	127
Galvanized Structural Steel Piles (12 in.)	linear foot	960		960
Pile Point Reinforcement	each	12		12
Class B Concrete (Substructure)	cu. yard	48.8		48.8
Type D Barrier	linear foot		235	235
Slab on Concrete NU-Girder	sq. yard		300	300
NU 43, Prestressed Concrete NU-Girder	linear foot		335	335
Slab Drain	each		14	14
Vertical Drain at End Bents	each	2		2
Plain Neoprene Bearing Pad	each		8	8

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

Cost of L4x4 ASTM A709 Grade 36 HP pile anchors and 3/4-inch diameter ASTM F3125 Grade A325 Type 1 bolts, complete in place, will be considered completely covered by the contract unit price for Galvanized Structural Steel Piles (12 in.).

Foundation Data

Type	Design Data		Bent Number 1	Bent Number 2
Load Bearing Pile	Pile Type and Size		HP 12x53	HP 12x53
	Number	ea	6	6
	Approximate Length Per Each	ft	79	81
	Pile Point Reinforcement	ea	All	All
	Min. Galvanized Penetration (Elev.)	ft	281	280
	Pile Driving Verification Method		DF	DF
	Resistance Factor		0.4	0.4
	Minimum Nominal Axial Compressive Resistance	kip	500	500

DF = FHWA-modified Gates Dynamic Pile Formula

Load Bearing Pile:

$$\text{Minimum Nominal Axial Compressive Resistance} = \frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$$

All piles shall be galvanized down to the minimum galvanized penetration (elevation).

Pile point reinforcement need not be galvanized. Shop drawings will not be required for pile point reinforcement.

The contractor shall make every effort to achieve the minimum galvanized penetration (elevation) shown on the plans for all piles. Deviations in penetration less than 5 feet of the minimum will be considered acceptable provided the contractor makes the necessary corrections to ensure the minimum penetration is achieved on subsequent piles.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED: 3/3/2023
ROUTE: 67 | STATE: MO
DISTRICT: BR | SHEET NO.: 2
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

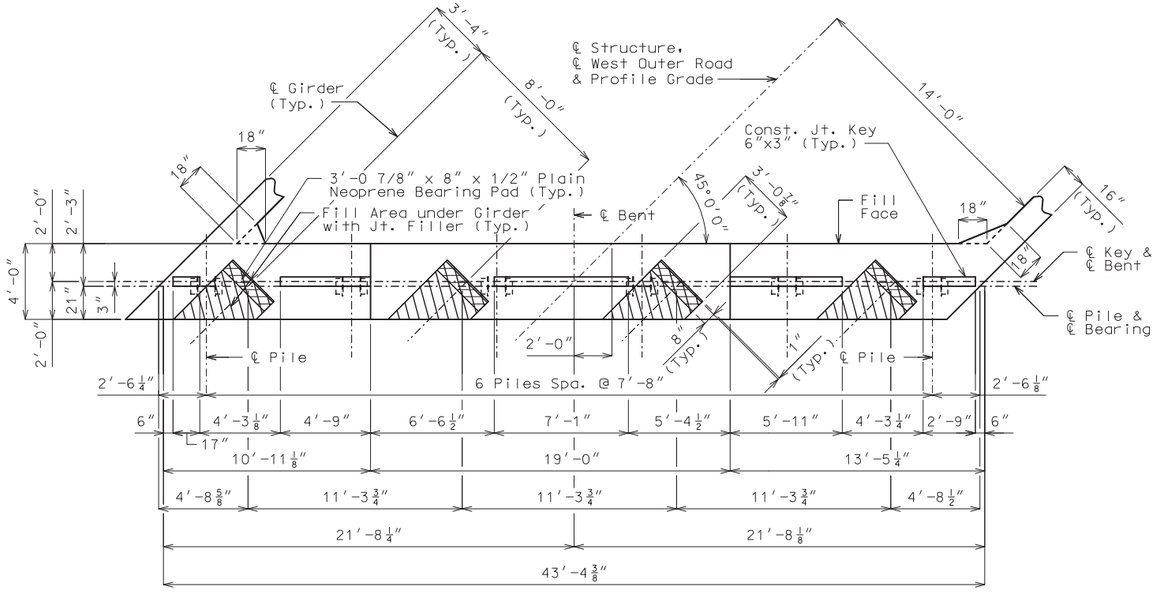
CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

ESTIMATED QUANTITIES AND GENERAL NOTES

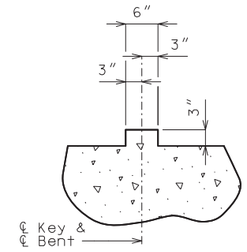
Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

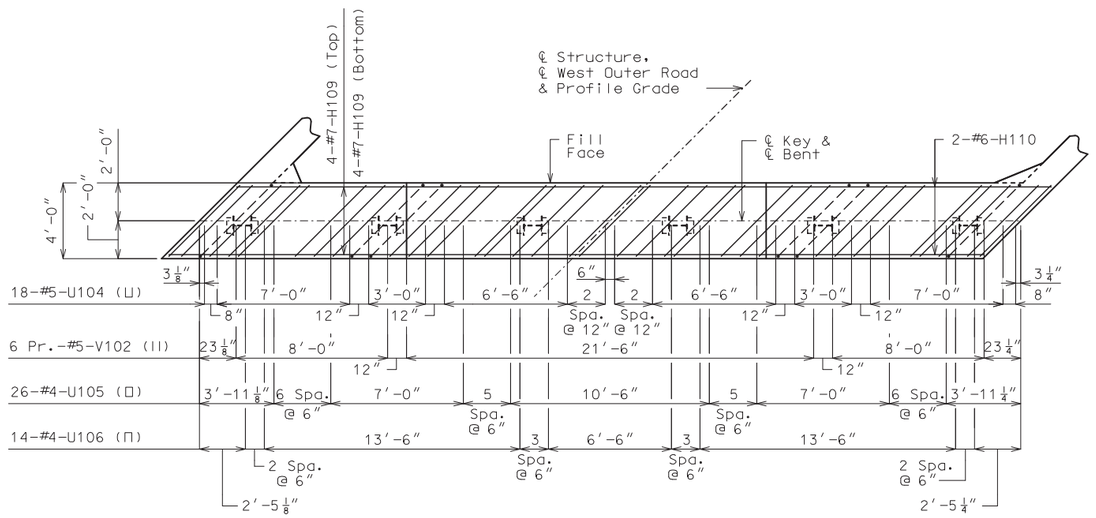
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_002_J9P3751_Estimated_Quantities_and_General_Notes.dgn 10:25:04 AM 3/3/2023



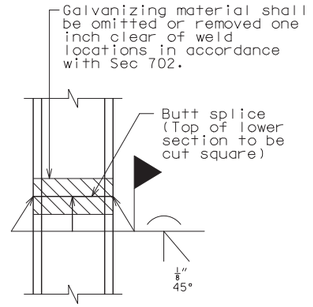
PLAN OF BEAM SHOWING DIMENSIONS



TYPICAL SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT
(Keys not shown for clarity)



STEEL PILE SPLICE
(If required)

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 4 & 5.

For details of Vertical Drain at End Bents, see Sheet No. 6.

The U bars and pairs of V bars shall be placed parallel to centerline of roadway.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

DETAILS OF END BENT NO. 1

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	3

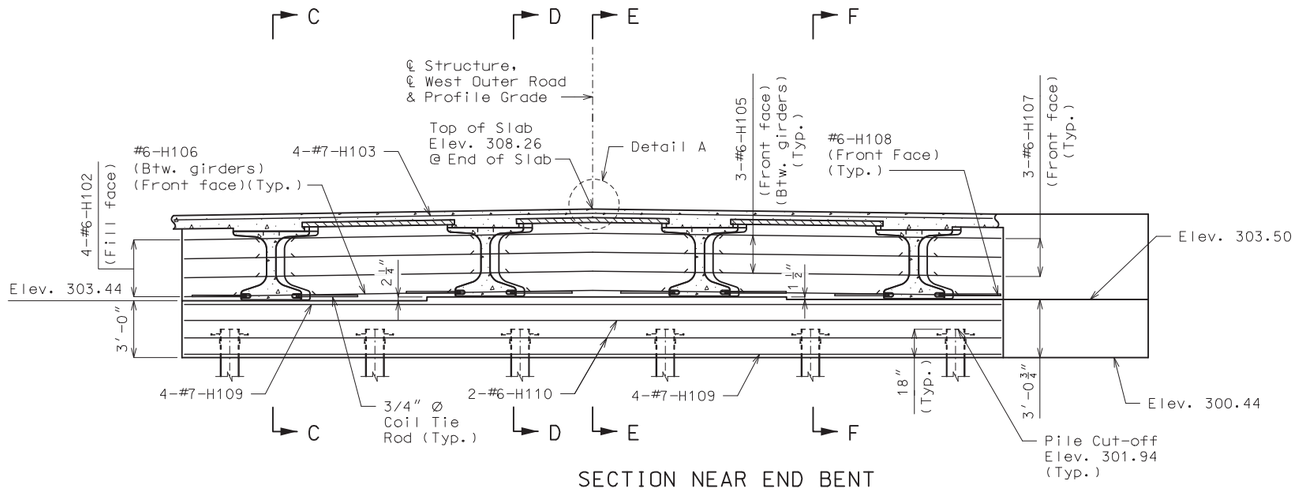
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

DESCRIPTION | DATE | REV.

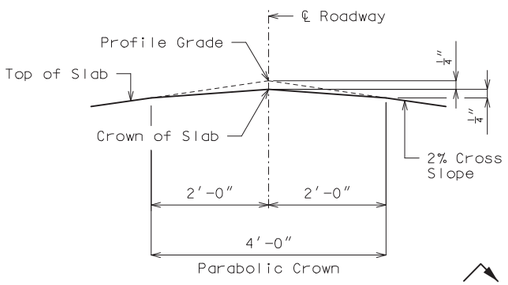
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



SECTION NEAR END BENT

Keys not shown for clarity.



DETAIL A

PART PLAN

* Centered behind girders

DETAILS OF END BENT NO. 1

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 3 & 5.

For Sections C-C, D-D, E-E, & F-F, see Sheet No. 5.

For Elevations A-A & B-B, see Sheet No. 5.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For location of Coil Tie Rods and #5-H104 (Strand Tie Bar), see Sheets No. 10 and 11.

For details of Vertical Drain at End Bents, see Sheet No. 6.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

The #6-F100 and #6-F101 bars shall be bent in the field to clear girders.

The U bars shall be placed parallel to centerline of roadway.

Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.

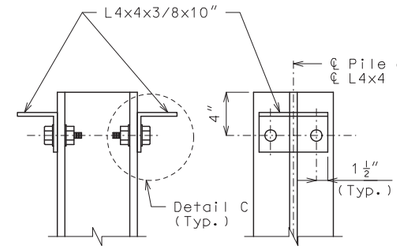
For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Bridge Approach Slab, see Sheet No. 19.

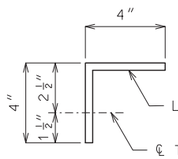
Substructure Quantity Table for Bent No. 1

Item		Quantity
Class 1 Excavation	cu. yard	45
Galvanized Structural Steel Piles (12 in.)	linear foot	474
Pile Point Reinforcement	each	6
Class B Concrete (Substructure)	cu. yard	24.4

Note: These quantities are included in the Estimated Quantities table on Sheet No. 2.



DETAILS OF HP PILE ANCHORS



DETAIL C

Angles shall be coated with a minimum of two coats of non-aluminum epoxy mastic primer to provide a dry film thickness of 4 mils minimum, 8 mils maximum, or galvanized in accordance with Sec 1081. Bolts, washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	4

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9369

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

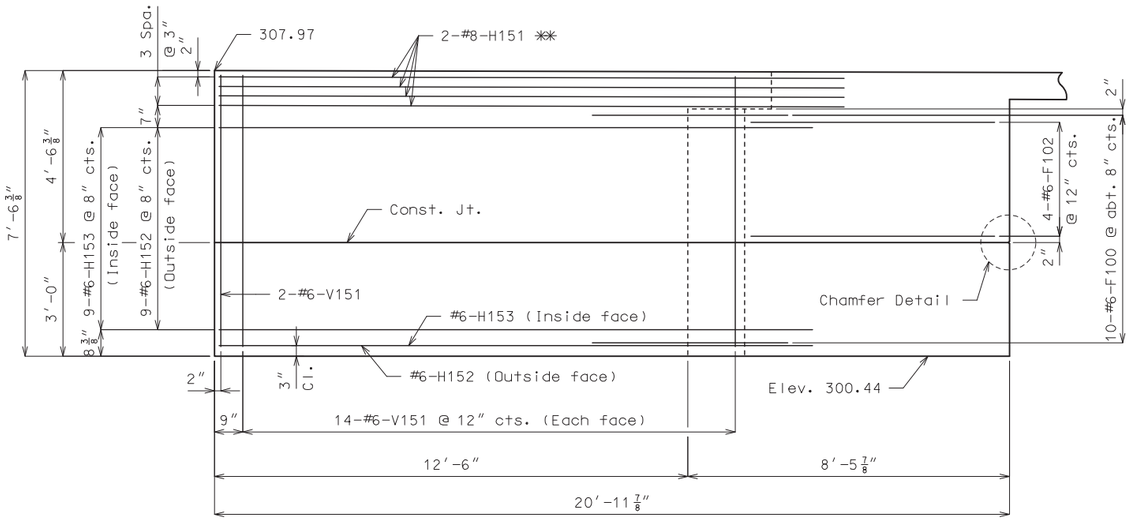
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

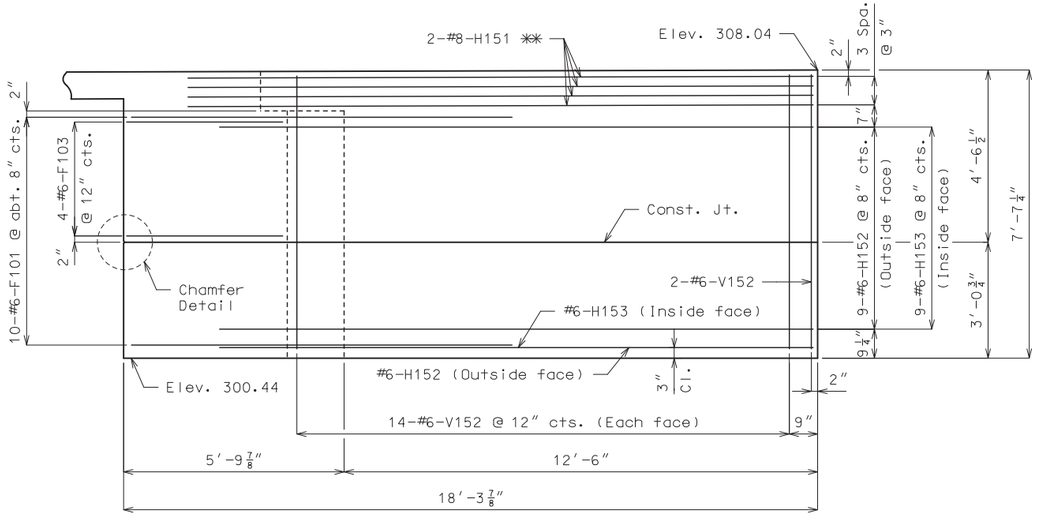
Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_004_J9P3751_End_Bent_1_Details.dgn 10:25:07 AM 3/3/2023

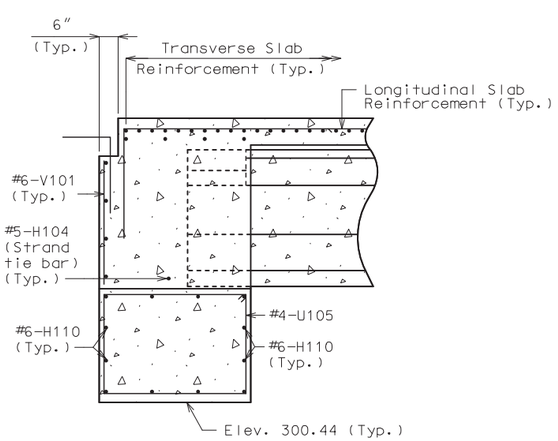


ELEVATION A-A

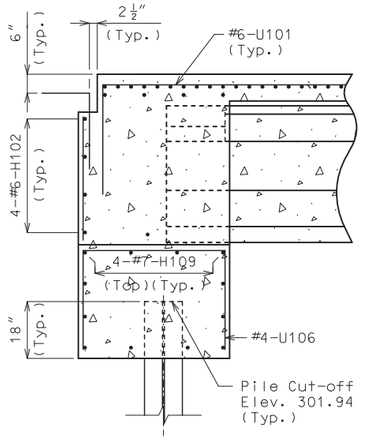


ELEVATION B-B

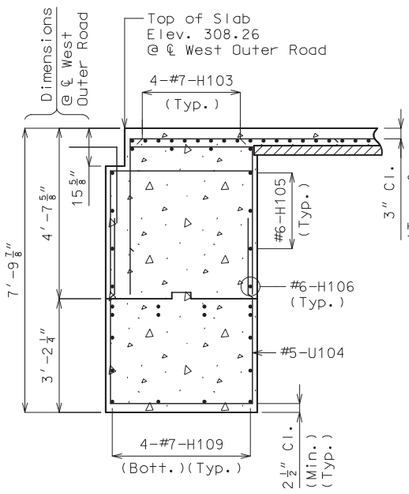
✱✱ (Place with grade)



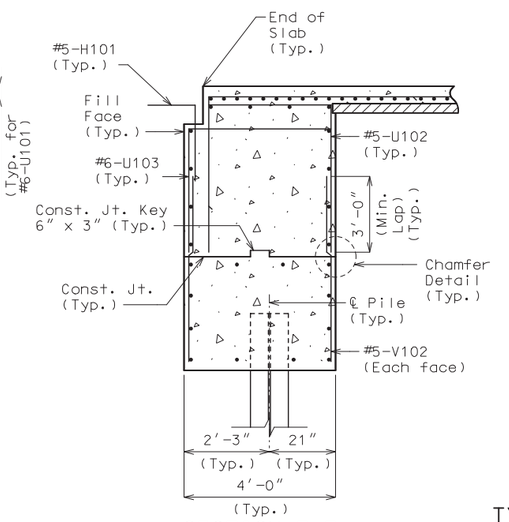
SECTION C-C



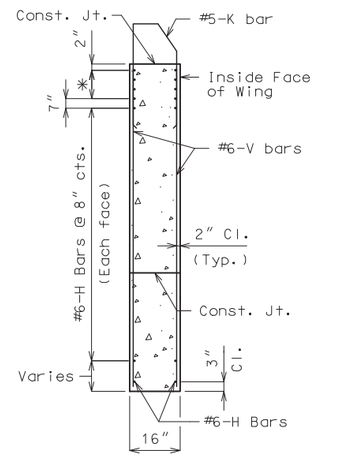
SECTION D-D



SECTION E-E

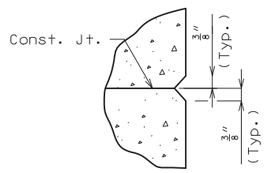


SECTION F-F



✱ #8-H bars @ 3″ cts. (Each face) (Place with grade)

TYPICAL SECTION THRU WING



CHAMFER DETAIL

General Notes:

For details of End Bent No. 1 not shown, see Sheets No. 3 & 4.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

The #6-F100 and #6-F101 bars shall be bent in field to clear girders.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Vertical Drain at End Bents, see Sheet No. 6.

For location of #5-H104 (Strand tie bar), see Sheets No. 10 and 11.

For location of Sections C-C, D-D, E-E, & F-F, see Sheet No. 4.

For location of Elevations A-A & B-B, see Sheet No. 4.

For details of Bridge Approach Slab, see Sheet No. 19.

DETAILS OF END BENT NO. 1

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	5

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

DESCRIPTION	DATE

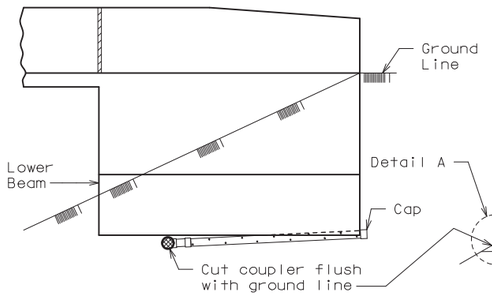
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

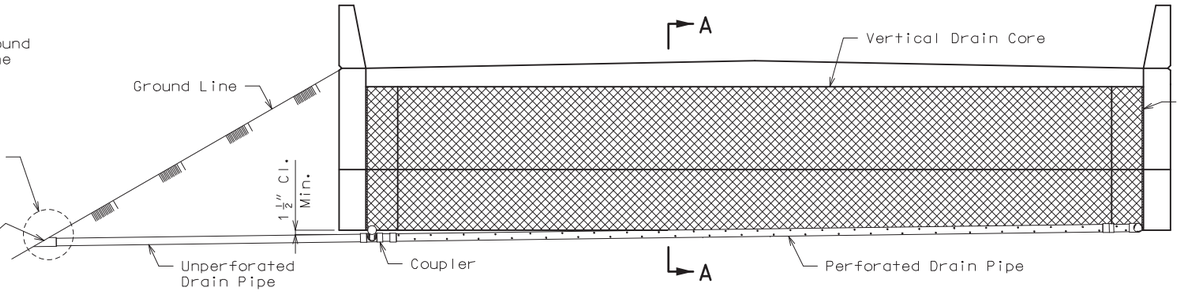
CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

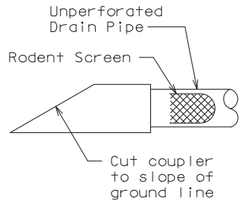
REV.



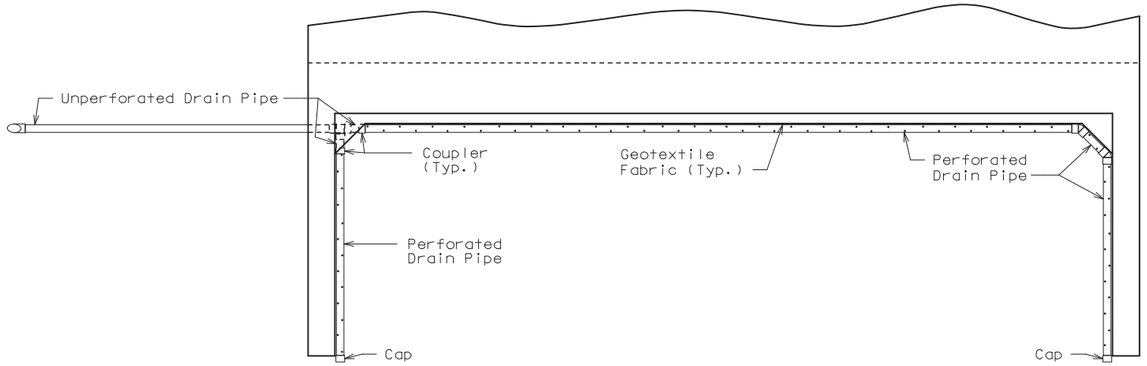
ELEVATION OF WING



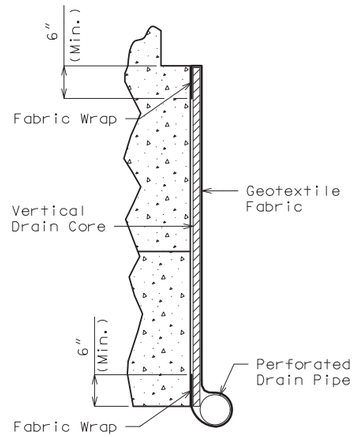
ELEVATION OF END BENT



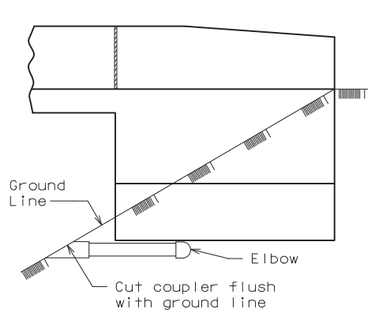
DETAIL A



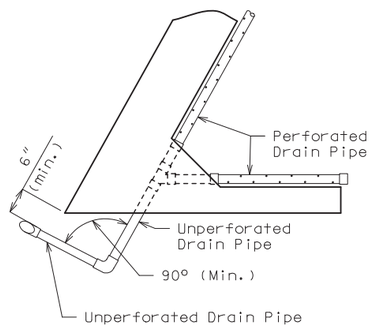
PLAN OF END BENT



PART SECTION A-A
(Section thru wing similar)



ELEVATION OF WING



PART PLAN

OPTIONAL TURNED DRAIN
(Use only when straight drain is not practical.)

General Notes:

All drain pipe shall be sloped 1 to 2 percent.

Drain pipe may be either 6-inch diameter corrugated metallic-coated steel pipe underdrain, 4-inch diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4-inch diameter corrugated polyethylene (PE) drain pipe.

Drain pipe shall be placed at fill face of end bent and inside face of wings. The pipe shall slope to lowest grade of ground line, also missing the lower beam of end bent by a minimum of 1 1/2 inches.

Perforated pipe shall be placed at fill face side and inside face of wings at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.

VERTICAL DRAIN AT END BENTS

(Squared end bent shown, skewed end bent similar)

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED	
3/3/2023	
ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	6
COUNTY	
BUTLER	
JOB NO.	
J9P3751	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO.	
A9369	

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

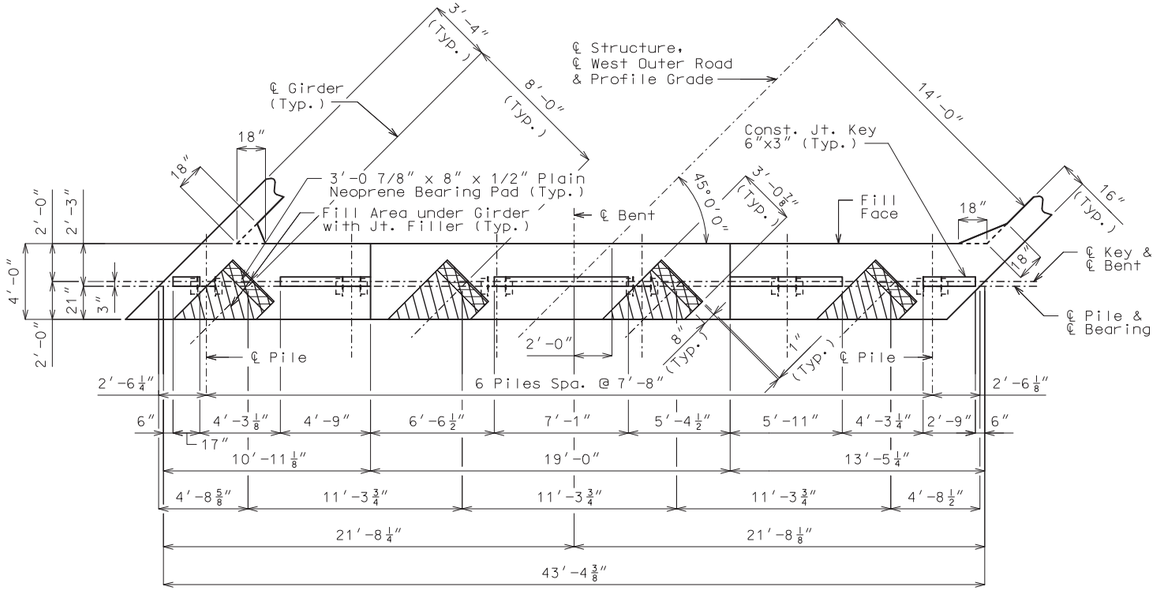
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

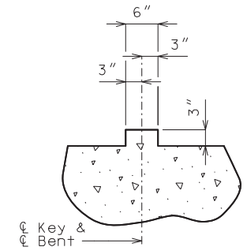
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

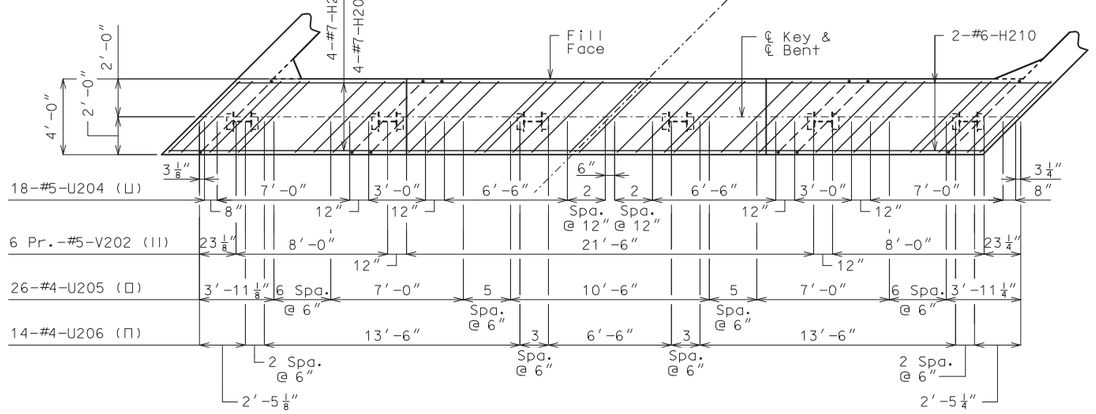
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_006_J9P3751_Vertical_Drain.dgn 10:25:10 AM 3/3/2023



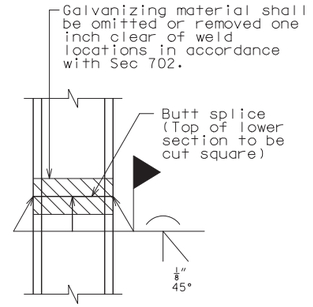
PLAN OF BEAM SHOWING DIMENSIONS



TYPICAL SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT
(Keys not shown for clarity)



STEEL PILE SPLICE
(If required)

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 8 & 9.

For details of Vertical Drain at End Bents, see Sheet No. 6.

The U bars and pairs of V bars shall be placed parallel to centerline of roadway.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2".

DETAILS OF END BENT NO. 2

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_007_J9P3751_End_Bent_2_Details.dgn 10:25:11 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	7

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

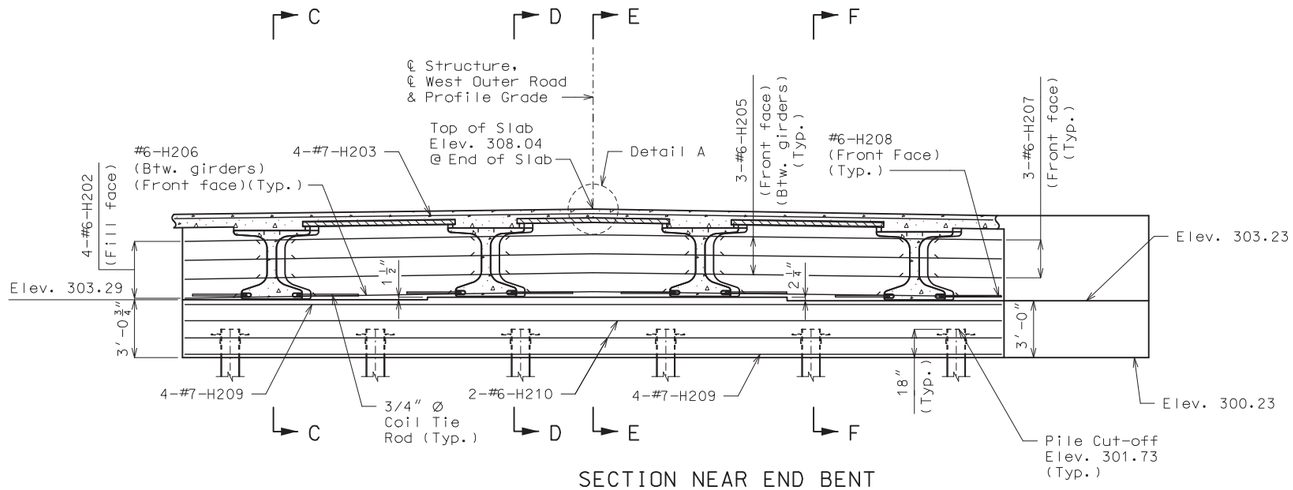
REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

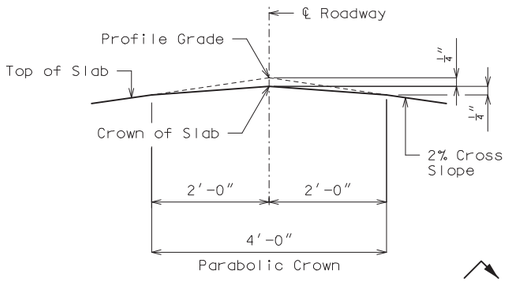
CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



SECTION NEAR END BENT

Keys not shown for clarity.



DETAIL A

PART PLAN

DETAILS OF END BENT NO. 2

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 7 & 9.

For Sections C-C, D-D, E-E, & F-F, see Sheet No. 9.

For Elevations A-A & B-B, see Sheet No. 9.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For location of Coil Tie Rods and #5-H204 (Strand Tie Bar), see Sheets No. 10 and 11.

For details of Vertical Drain at End Bents, see Sheet No. 6.

Reinforcing steel shall be shifted to clear piles, U bars shall clear piles by at least 1 1/2″.

The #6-F200 and #6-F201 bars shall be bent in the field to clear girders.

The U bars shall be placed parallel to centerline of roadway.

Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.

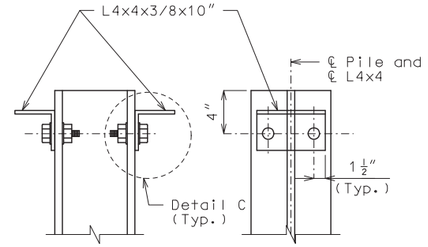
For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Bridge Approach Slab, see Sheet No. 19.

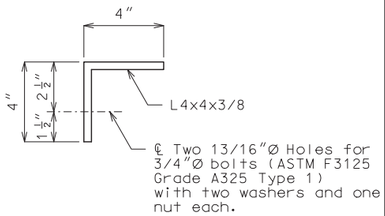
Substructure Quantity Table for Bent No. 2

Item		Quantity
Class 1 Excavation	cu. yard	115
Galvanized Structural Steel Piles (12 in.)	linear foot	486
Pile Point Reinforcement	each	6
Class B Concrete (Substructure)	cu. yard	24.4

Note: These quantities are included in the Estimated Quantities table on Sheet No. 2.



DETAILS OF HP PILE ANCHORS



DETAIL C

Angles shall be coated with a minimum of two coats of non-aluminum epoxy mastic primer to provide a dry film thickness of 4 mils minimum, 8 mils maximum, or galvanized in accordance with Sec 1081. Bolts, washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	8

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9369

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

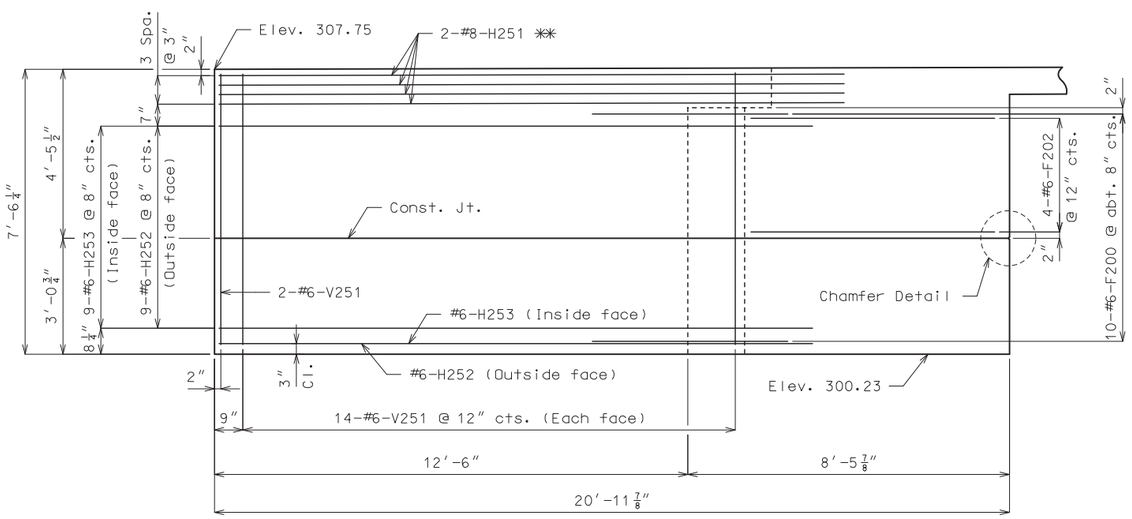
REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

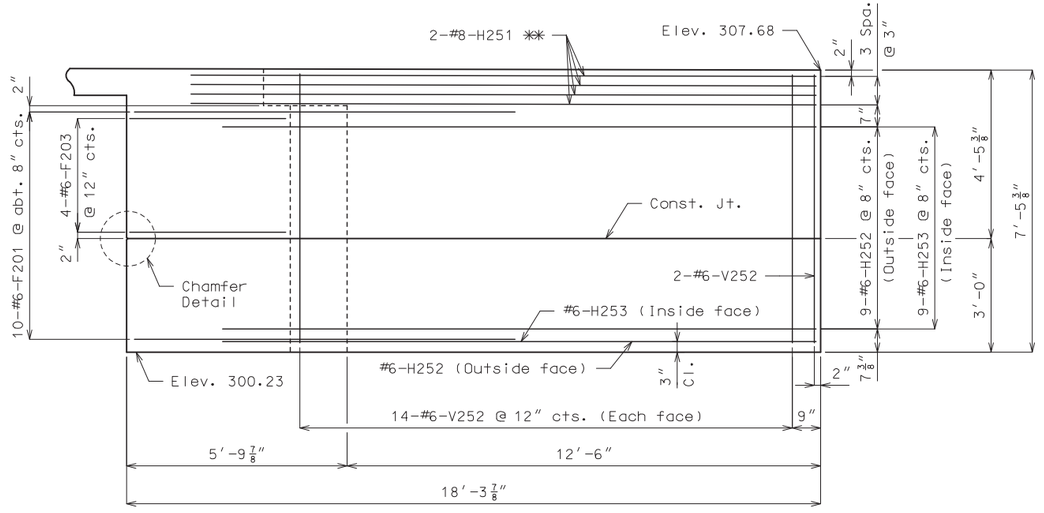
CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

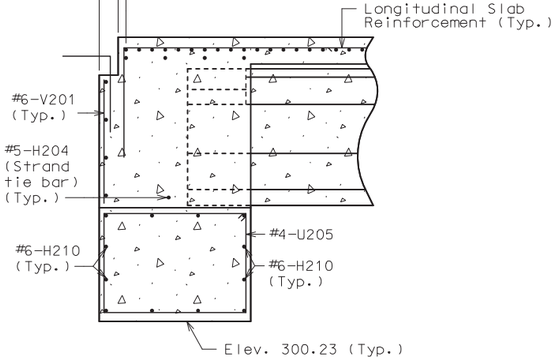


ELEVATION A-A

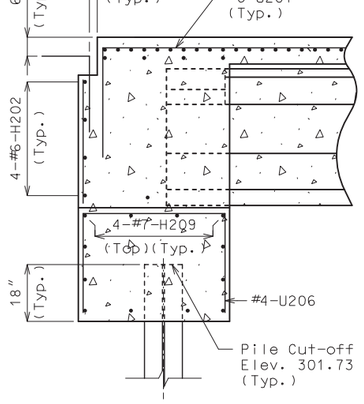


ELEVATION B-B

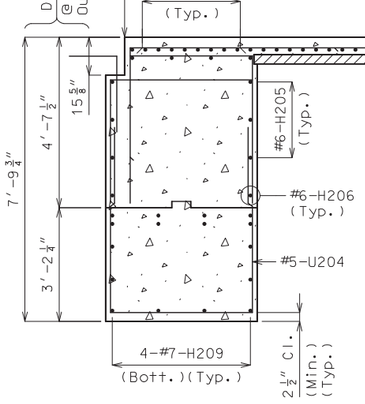
** (Place with grade)



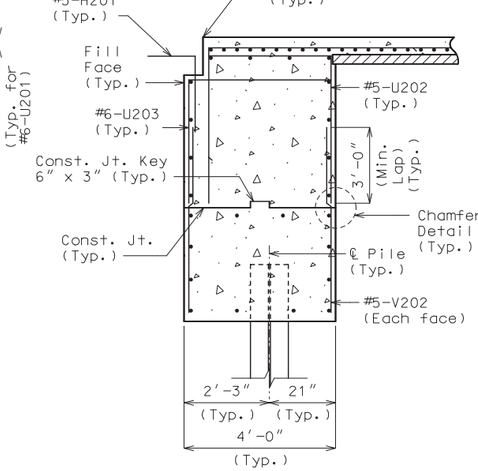
SECTION C-C



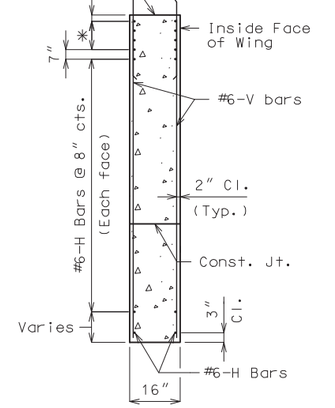
SECTION D-D



SECTION E-E

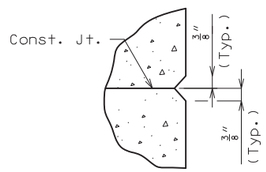


SECTION F-F



* #8-H bars @ 3" cts. (Each face) (Place with grade)

TYPICAL SECTION THRU WING



CHAMFER DETAIL

General Notes:

For details of End Bent No. 2 not shown, see Sheets No. 7 & 8.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

The #6-F200 and #6-F201 bars shall be bent in field to clear girders.

For details and reinforcement of the Type D Barrier, see Sheet No. 18.

For details of Vertical Drain at End Bents, see Sheet No. 6.

For location of #5-H204 (Strand tie bar), see Sheets No. 10 and 11.

For location of Sections C-C, D-D, E-E, & F-F, see Sheet No. 8.

For location of Elevations A-A & B-B, see Sheet No. 8.

For details of Bridge Approach Slab, see Sheet No. 19.

DETAILS OF END BENT NO. 2

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	9

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

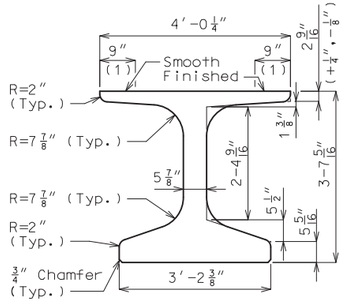
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

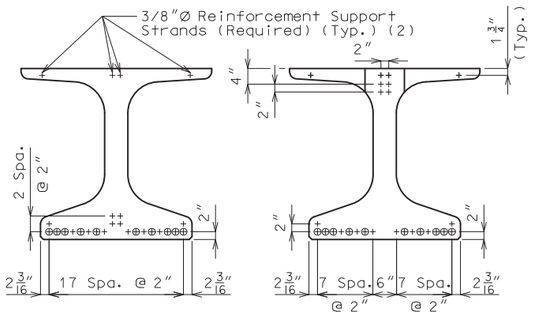
REV.

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



DIMENSIONS

(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about ℄ Girder. May be moved laterally in pairs.

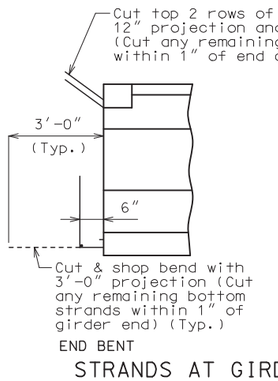


℄ GIRDER END OF GIRDER

STRAND ARRANGEMENT

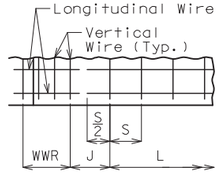
\+ Indicates prestressing strand.

o Indicates cut & shop bend with 3′-0″ projection.



END BENT

STRANDS AT GIRDER ENDS



WELDED WIRE PLACEMENT

S = Vertical wire spacing

L = Length of WWR mats

J = Distance between WWR mats

Bill of Reinforcing Steel

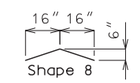
Bars Each Girder

No.	Size/Mark	Length	Shape
105	3 G1	2′-10″	8
2	4 G3	5′-5″	20
14	4 G6	Varies	20

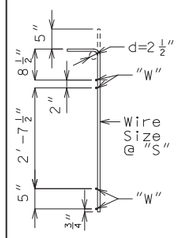
Welded Wire Each Girder

Mark	Size	S	W	L	J
WWR1	D31	4″	W12	4′-4″	8″
WWR2	D31	8″	W12	22′-8″	12″
WWR3	D31	12″	W12	23′-0″	–
WWR6	D31	2″	W12	16″	2¾″

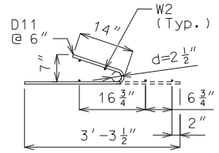
Bending Diagrams



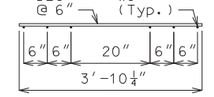
Shape 20



WWR1, WWR2, WWR3 & WWR6



WWR4



WWR5

All dimensions are out to out.

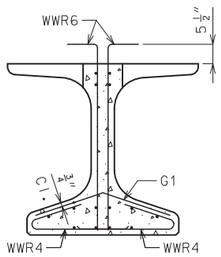
Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1″, unless otherwise shown.

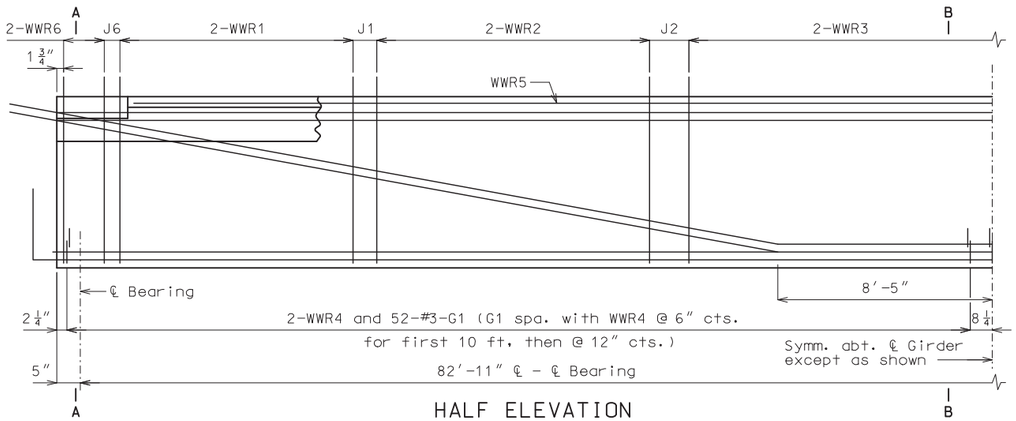
All bar reinforcement shall be Grade 60.

WWR shall not be epoxy coated.



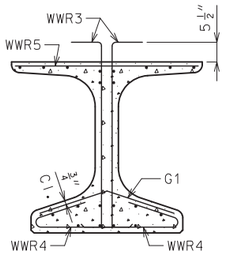
SECTION A-A

Strands not shown for clarity.



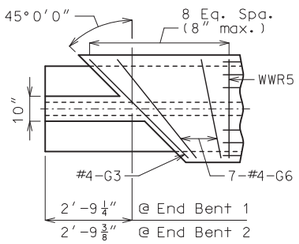
HALF ELEVATION

Reinforcement support strands not shown for clarity.

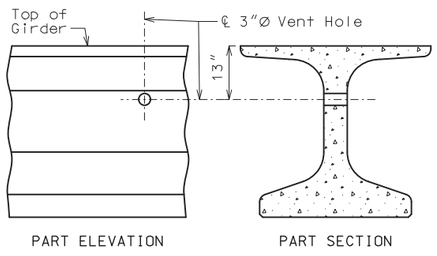


SECTION B-B

Strands not shown for clarity.



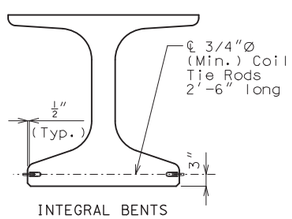
TOP FLANGE BLOCKOUT



PART ELEVATION PART SECTION

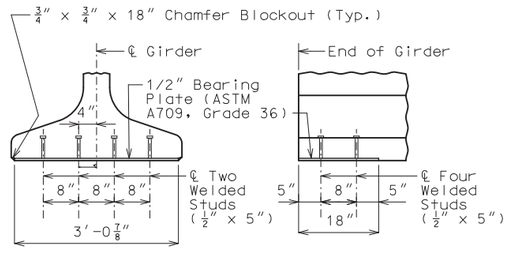
VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum.



INTEGRAL BENTS

COIL TIES



END VIEW SIDE VIEW

BEARING PLATE

NU-GIRDERS - SPAN (1-2)

General Notes:

Concrete for prestressed beams shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

Use 22 strands, 0.6″Ø Grade 270, with an initial prestress force of 967 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

For Girder Camber Diagram, see Sheet No. 14.

For location of coil inserts at slab drains, see Sheet No. 13.

For location of coil ties at integral bents see Sheets No. 4 and 8.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	10

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9369

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

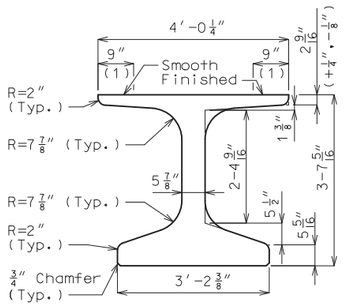
REV.

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

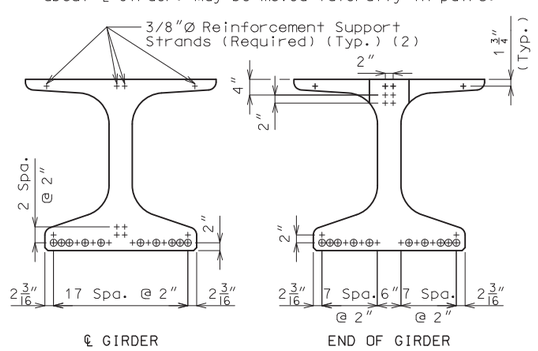
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_010_J9P3751_NU_Girder_WWR.dgn 10:25:16 AM 3/3/2023

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



DIMENSIONS

(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about ℄ Girder. May be moved laterally in pairs.

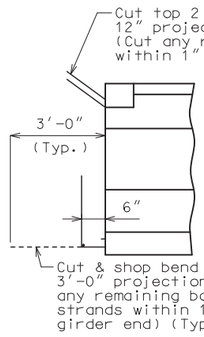


℄ GIRDER END OF GIRDER

STRAND ARRANGEMENT

\+ Indicates prestressing strand.

o Indicates cut & shop bend with 3′-0″ projection.



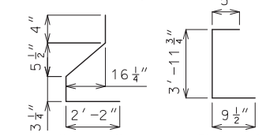
END BENT

STRANDS AT GIRDER ENDS

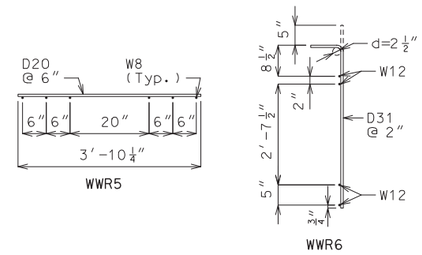
Bill of Reinforcing Steel - Each Girder

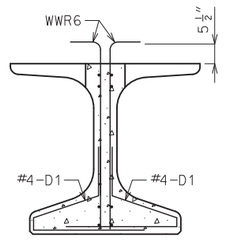
No.	Size/ Mark	Length	Shape
216	5 B1	5′-0″	11
236	4 D1	4′-0″	9
2	4 G3	5′-5″	20
14	4 G6	Varies	20

Bending Diagrams



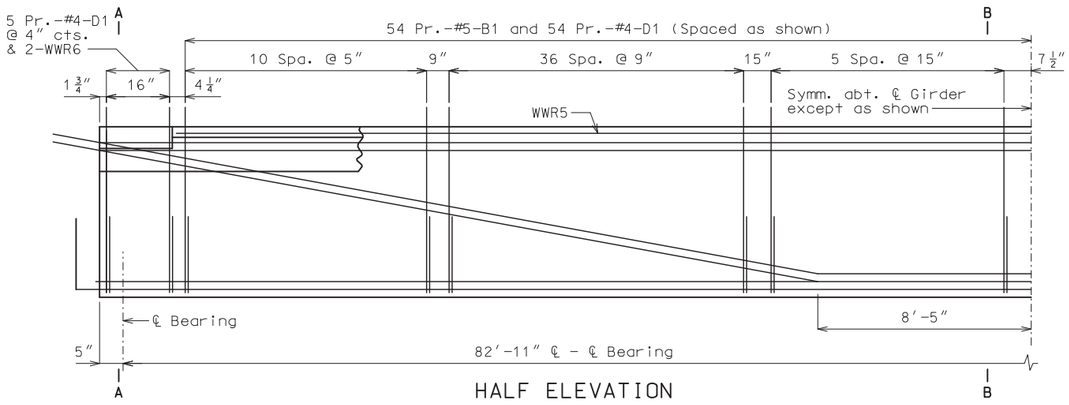
Welded Wire Reinforcement - Each Girder





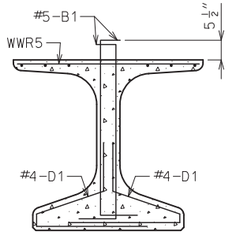
SECTION A-A

Strands not shown for clarity.



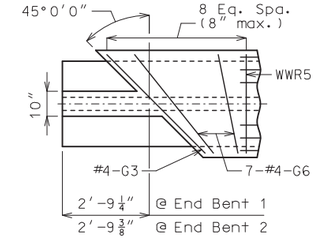
HALF ELEVATION

Reinforcement support strands not shown for clarity.

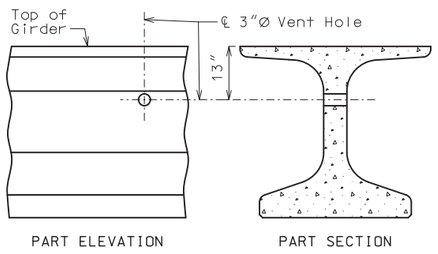


SECTION B-B

Strands not shown for clarity.

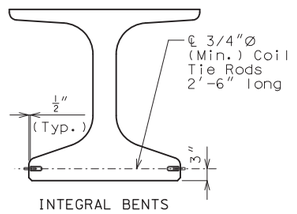


TOP FLANGE BLOCKOUT



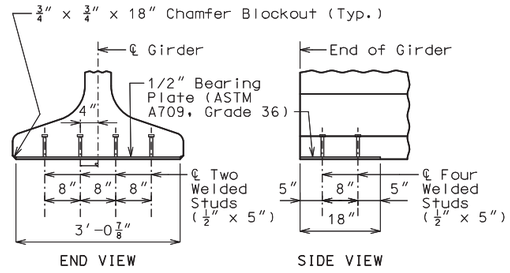
VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum.



INTEGRAL BENTS

COIL TIES



BEARING PLATE

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1″.

All bar reinforcement shall be Grade 60.

The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 bars shall be epoxy coated.

General Notes:

Concrete for prestressed girders shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

Use 22 strands, 0.6″Ø Grade 270, with an initial prestress force of 967 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

For Girder Camber Diagram, see Sheet No. 14.

For location of coil inserts at slab drains, see Sheet No. 13.

For location of coil ties at integral bent, see Sheets No. 4 and 8.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

NU-GIRDERS (ALTERNATE REINFORCEMENT) - SPAN (1-2)

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	11

COUNTY BUTLER

JOB NO. J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9369

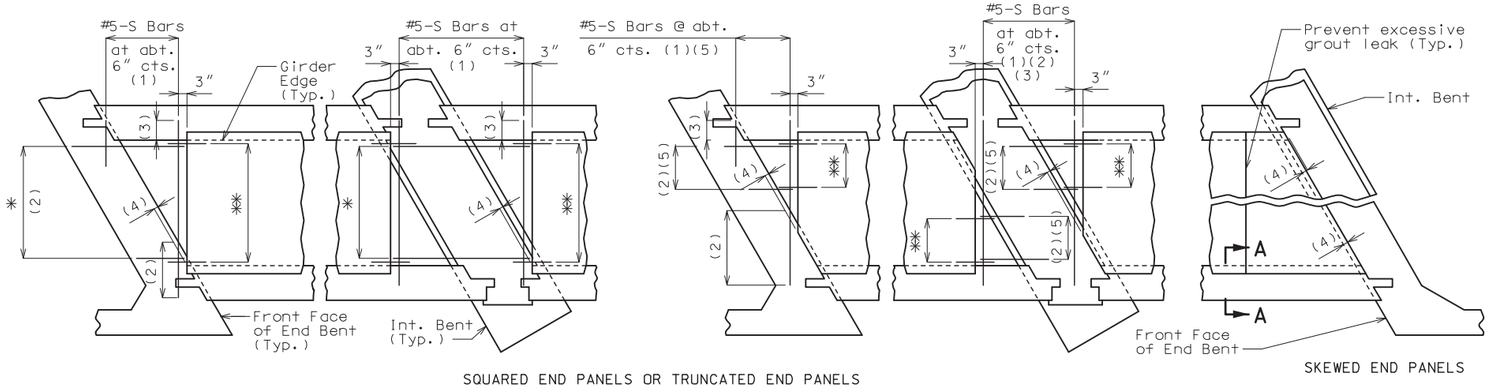
REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

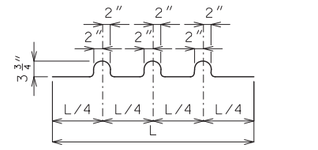
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



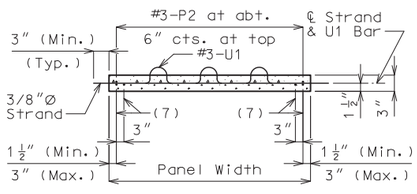
PLAN SHOWING PANELS PLACEMENT

✳ #5-S Bars at abt. 9" cts. (1)
✳✳ #3-P1 at 12" cts. (End panels only)

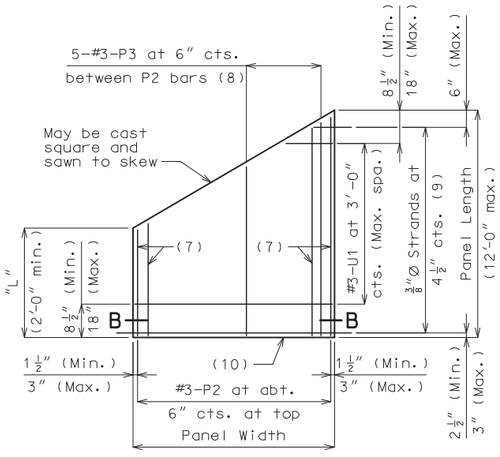


BENDING DIAGRAM FOR U1 BAR

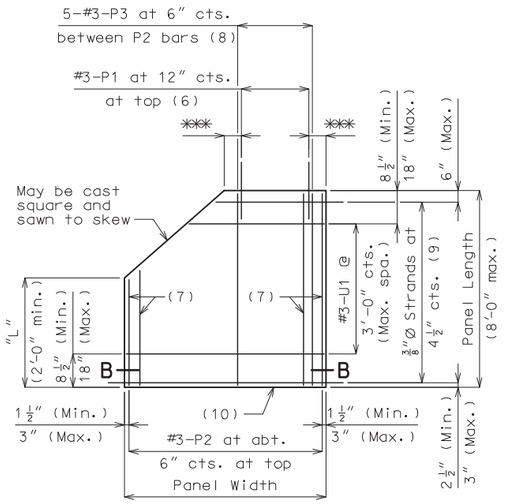
U1 Bars may be oriented at right angles to location and spacing shown. U1 Bars shall be placed between P1 bars.



SECTION B-B

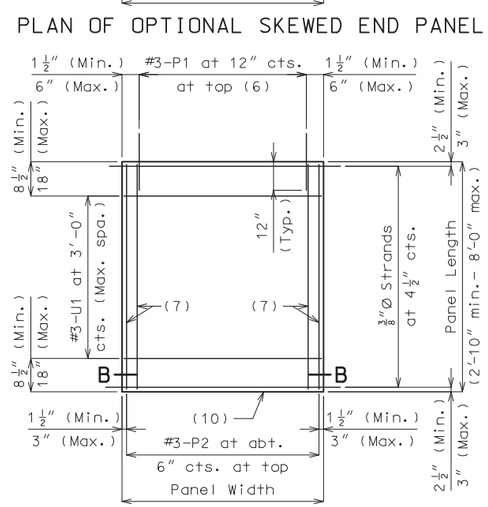


PLAN OF OPTIONAL SKEWED END PANEL

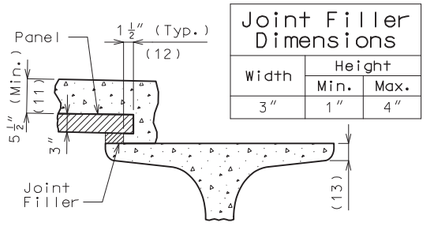


PLAN OF OPTIONAL TRUNCATED END PANEL

✳✳✳ 3" (Min.), 6" (Max.)



PLAN OF SQUARED PANEL



SECTION A-A

Joint Filler Dimensions		
Width	Height	
	Min.	Max.
3"	1"	4"

Reference Notes:

Plan of Panels Placement:

(1) S-bars shown are bottom steel in slab between panels and used with squared and truncated end panels only.

(2) Extend S-bars 18 inches beyond the front face of end bents and int. bents for squared and truncated end panels only.

(3) Extend S-bars 9 inches beyond edge of girder (Typ.).

(4) End panels shall be dimensioned 1/2" min. to 1 1/2" max. from the inside face of diaphragm.

(5) For truncated end panels, use a min. of #5-S bars at 6" crossings in openings, or min. 4x4-W7xW7.

Plans of Panels:

(6) For end panels only, P1 bars shall be 2'-0" in length and embedded 12". P1 bars will not be required for panels at squared integral end bents.

(7) #3-P2 bars near edge of panel at bottom (under strands).

(8) Use #3-P3 bars if panel is skewed 45° or greater.

(9) Any strand 2'-0" or shorter shall have a #4 reinforcing bar on each side of it, centered between strands. Strands 2'-0" or shorter may then be debonded at the fabricator's option.

(10) Optional 1/2" x 45° Chamfer one or both sides at bottom.

Section A-A:

(11) Slab thickness over prestressed panels varies due to girder camber. In order to maintain minimum slab thickness, it may be necessary to raise the grade uniformly throughout the structure. No payment will be made for additional labor or materials required for necessary grade adjustment.

(12) Contractor shall ensure proper consolidation under and between panels.

(13) At the contractor's option, the variation in slab thickness over prestressed panels may be eliminated or reduced by increasing and varying the girder top flange thickness. Dimensions shall be shown on the shop drawings.

General Notes:

Prestressed Panels:

Concrete for prestressed panels shall be Class A-1 with f'c = 6,000 psi, f'ci = 4,000 psi.

The top surface of all panels shall receive a scored finish with a depth of scoring of 1/8" perpendicular to the prestressing strands in the panels.

Prestressing tendons shall be high-tensile strength, uncoated, seven-wire, low-relaxation strands for prestressed concrete in accordance with AASHTO M 203 Grade 270, with nominal diameter of strand = 3/8" and nominal area = 0.085 sq.in. and minimum ultimate strength = 22.95 kips (270 ksi). Larger strands may be used with the same spacing and initial tension.

Initial prestressing force = 17.2 kips/strand.

The method and sequence of releasing the strands shall be shown on the shop drawings.

Suitable anchorage devices for lifting panels may be cast in panels, provided the devices are shown on the shop drawings and approved by the engineer. Panel lengths shall be determined by the contractor and shown on the shop drawings.

When squared end panels are used at skewed bents, the skewed portion shall be cast full depth. No separate payment will be made for additional concrete and reinforcing required.

Support from diaphragm forms is required under the optional skewed end until cast-in-place concrete has reached 3,000 psi compressive strength.

Prestressed panels shall be brought to saturated surface-dry (SSD) condition just prior to the deck pour. There shall be no free standing water on the panels or in the area to be cast.

The prestressed panel quantities are not included in the table of estimated quantities for the slab.

Reinforcing Steel:

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

If U1 bars interfere with placement of slab steel, U1 loops may be bent over, as necessary, to clear slab steel.

Deformed welded wire reinforcement (WWR) providing a minimum area of reinforcing perpendicular to strands of 0.22 sq in./ft, with spacing parallel to strands sufficient to ensure proper handling, may be used in lieu of the #3-P2 bars shown. Wire diameter shall not be larger than 0.375 inch. The above alternative reinforcement criteria may be used in lieu of the #3-P3 bars, when required, and placed over a width not less than 2 feet.

The following reinforcing steel shall be tied securely to the strands with the following maximum spacing in each direction:
#3-P2 bars at 16 inches.
WWR at 24 inches.

The #3-U1 bars shall be tied securely to #3-P2 bars, to WWR or to strands (when placed between P1 bars) at about 3-foot centers.

Minimum reinforcement steel length shall be 2'-0".

All reinforcement other than prestressing strands shall be epoxy coated.

Precast panels may be in contact with stirrup reinforcing in diaphragms.

S-bars are not listed in the bill of reinforcing.

Cost of S-bars will be considered completely covered by the contract unit price for the slab.

Joint Filler:

Joint filler shall be preformed fiber expansion joint material in accordance with Sec 1057 or expanded or extruded polystyrene bedding material in accordance with Sec 1073.

Use Slab Haunching Diagram on Sheet No. 14 for determining thickness of joint filler within the limits noted in the table of Joint Filler Dimensions.

Thicker material may be used on one or both sides of the girder to reduce cast-in-place concrete thickness to within tolerances.

The same thickness of preformed fiber expansion joint material shall be used under any one edge of any panel except at locations where top flange thickness may be stepped. The maximum change in thickness between adjacent panels shall be 1/4 inch. The polystyrene bedding material may be cut with a transition to match haunch height above top of flange.

Joint filler shall be glued to the girder. When thickness exceeds 1 1/2 inches, the joint filler shall be glued top and bottom. The glue used shall be the type recommended by the joint filler manufacturer.

Edges of panels shall be uniformly seated on the joint filler before slab reinforcement is placed.

DETAILS OF PRESTRESSED PANELS

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	12

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

DESCRIPTION | DATE | REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

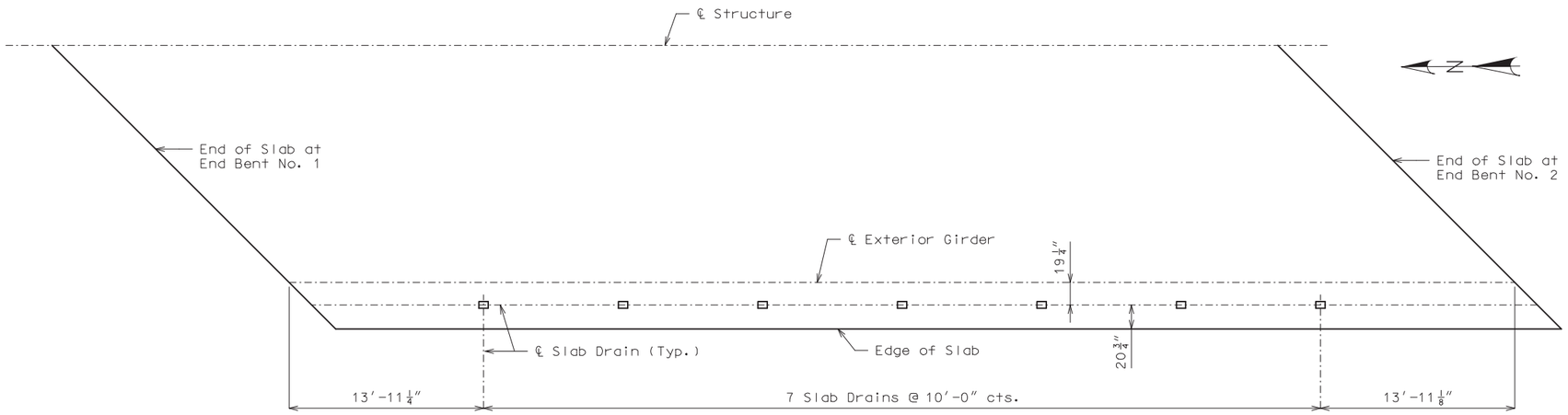
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Detailed Jan. 2023
Checked Jan. 2023

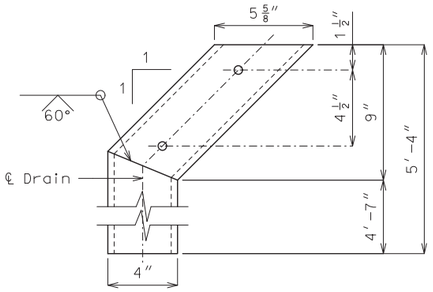
Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_012_J9P3751_Precast_Prestressed_Panels.dgn 10:25:18 AM 3/3/2023

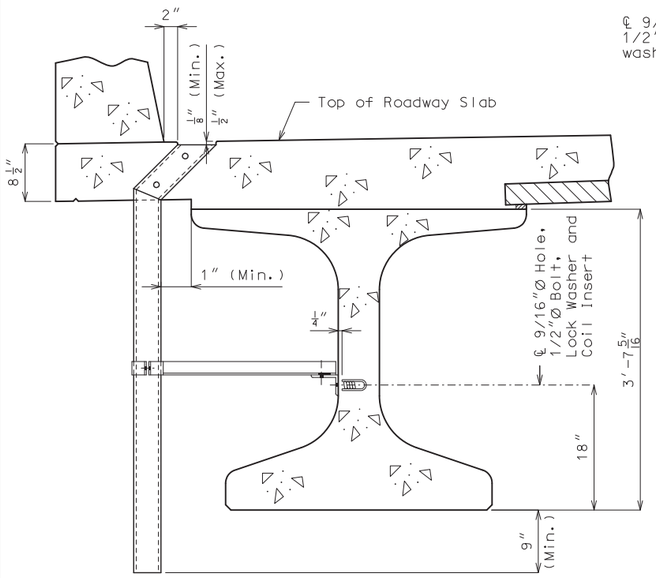


PART PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS

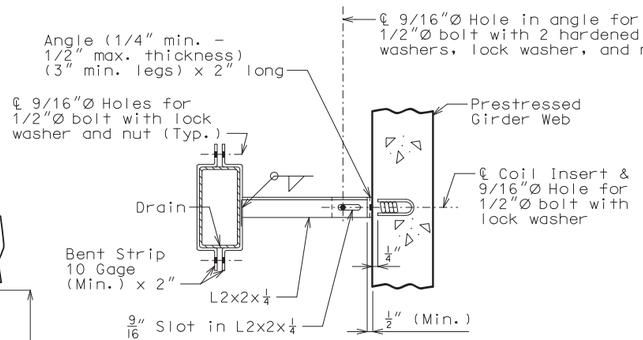
(Right side shown, left side similar)
Note: Longitudinal dimensions are horizontal.



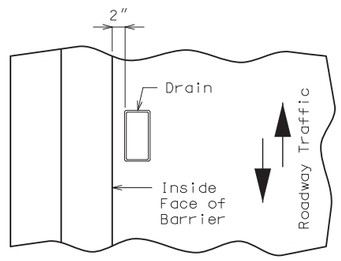
ELEVATION OF DRAIN



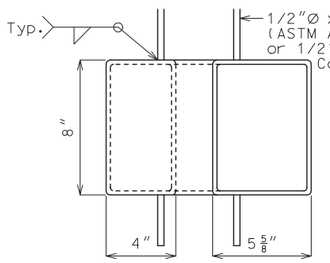
PART SECTION NEAR DRAIN



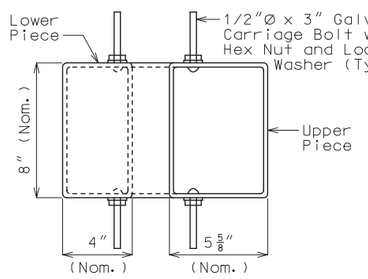
PART SECTION SHOWING BRACKET ASSEMBLY



PART PLAN OF SLAB AT DRAIN



PLAN OF STEEL DRAIN OPTION



PLAN OF FRP DRAIN OPTION

SLAB DRAINS

General Notes:

Contractor shall have the option to construct either steel or FRP slab drains. All drains shall be of same type.

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Locate drains in slab by dimensions shown in Part Section Near Drain.

Reinforcing steel shall be shifted to clear drains.

The coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

All 1/2"Ø bolts shall be ASTM A307.

Shop drawings will not be required for the slab drains and the bracket assembly.

The coil insert required for the bracket assembly attachment shall be located on the prestressed girder shop drawings.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed girder fabricator.

Notes for Steel Drain:

Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Outside dimensions of drains are 8" x 4".

The drains shall be galvanized in accordance with ASTM A123.

Notes for FRP Drain:

Drains shall be machine filament-wound thermosetting resin tubing meeting the requirements of ASTM D2996 with the following exceptions:

Shape of drains shall be rectangular with outside nominal dimensions of 8" x 4".

Minimum reinforced wall thickness shall be 1/4 inch.

The resin used shall be ultraviolet (UV) resistant and/or have UV inhibitors mixed throughout. Drains may have an exterior coating for additional UV resistance.

The color of the slab drain shall be gray (Federal Standard 26373). The color shall be uniform throughout the resin and any coating used.

The combination of materials used in the manufacture of the drains shall be tested for UV resistance in accordance with ASTM D4329 Cycle A. The representative material shall withstand at least 500 hours of testing with only minor discoloration and without any physical deterioration. The contractor shall furnish the results of the required ultraviolet testing prior to acceptance of the slab drains.

At the contractor's option, drains may be field cut. The method of cutting FRP slab drain shall be as recommended by the manufacturer to ensure a smooth, chip free cut.

Both upper and lower drain pieces shall be rigidly connected to each other. Drain flow shall not be obstructed. Approval of the engineer is required.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	13

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.	DESCRIPTION	DATE

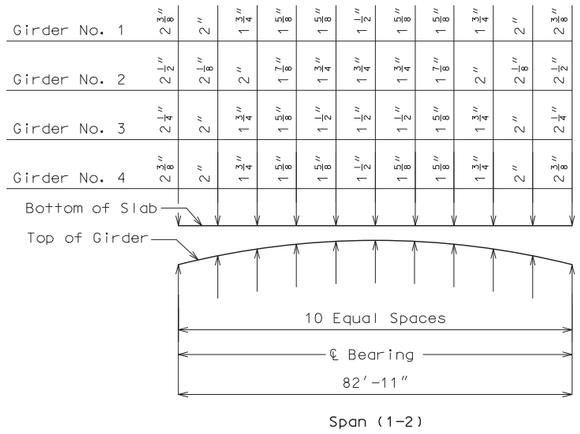
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_013_J9P3751_Slab_Drain.dgn 10:25:20 AM 3/3/2023



Span (1-2)

THEORETICAL SLAB HAUNCHING DIAGRAM

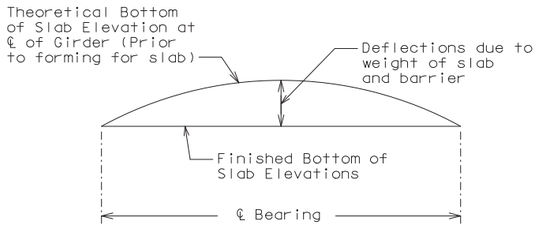
If girder camber is different from that shown in the camber diagram, in order to maintain minimum slab thickness, an adjustment of the slab haunches, an increase in slab thickness or a raise in grade uniformly throughout the structure shall be necessary. No payment will be made for additional labor or materials required for variation in haunching, slab thickness or grade adjustment.

Concrete in the slab haunches is included in the Estimated Quantities for Slab on Concrete NU-Girder.

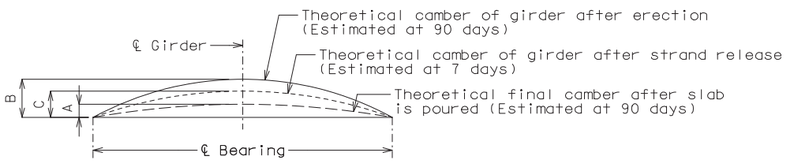
Theoretical Bottom of Slab Elevations at Centerline of Girder (Prior to forming for slab) (Estimated at 90 days)

Girder Number	Span (1-2) (82'-11" ℄ Brg. - ℄ Brg.)										
	℄ Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ Brg.
1	307.35	307.36	307.37	307.37	307.36	307.35	307.32	307.29	307.24	307.20	307.15
2	307.49	307.50	307.51	307.52	307.51	307.49	307.47	307.43	307.39	307.34	307.29
3	307.47	307.48	307.49	307.50	307.49	307.47	307.45	307.41	307.37	307.32	307.27
4	307.29	307.30	307.31	307.31	307.30	307.29	307.26	307.23	307.18	307.14	307.09

Elevations are based on a constant slab thickness of 8 1/2" and include allowance for theoretical dead load deflections due to weight of slab (including precast panel) and barrier.



TYPICAL SLAB ELEVATIONS DIAGRAM



Girder	Span (1-2)		
	A	B	C
Exterior	7/8"	2"	1 1/8"
Interior	3/4"		

GIRDER CAMBER DIAGRAM

Conversion factors for girder camber (Estimated at 90 days):

0.1 pt. = 0.314 x 0.5 pt.
0.2 pt. = 0.593 x 0.5 pt.
0.3 pt. = 0.813 x 0.5 pt.
0.4 pt. = 0.952 x 0.5 pt.

TBOS, HAUNCHING AND CAMBER

Detailed Jan. 2023
Checked Jan. 2023

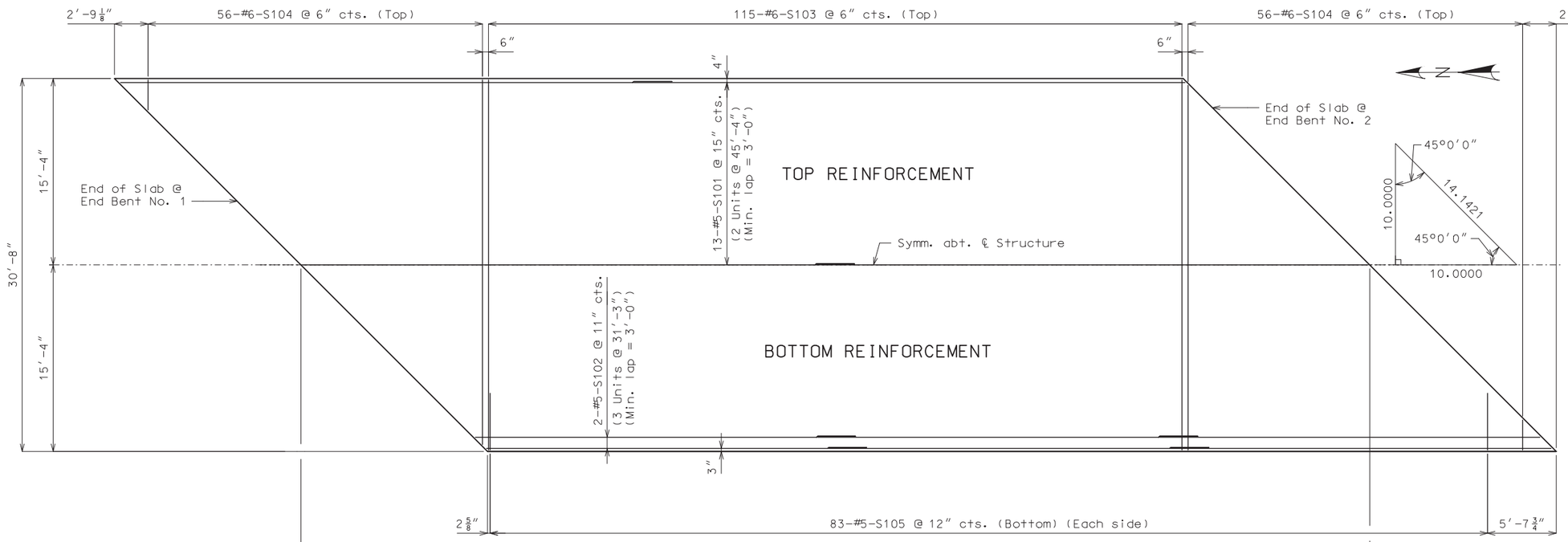
Note: This drawing is not to scale. Follow dimensions.

DATE PREPARED: 3/3/2023
ROUTE: 67 | STATE: MO
DISTRICT: BR | SHEET NO.: 14
COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

REV.	DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



PLAN OF SLAB SHOWING REINFORCEMENT

General Notes:

Longitudinal slab dimensions shown are horizontally.

For details of Precast Prestressed Panels, see Sheet No. 12.

For Theoretical Bottom of Slab Elevations, Girder Camber Diagram, and Theoretical Slab Haunching Diagram, see Sheet No. 14.

For Section Thru Slab, see Sheet No. 16.

For details and reinforcement of Type D Barrier not shown, see Sheets No. 17 and 18.

SLAB REINFORCEMENT DETAILS

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	15

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

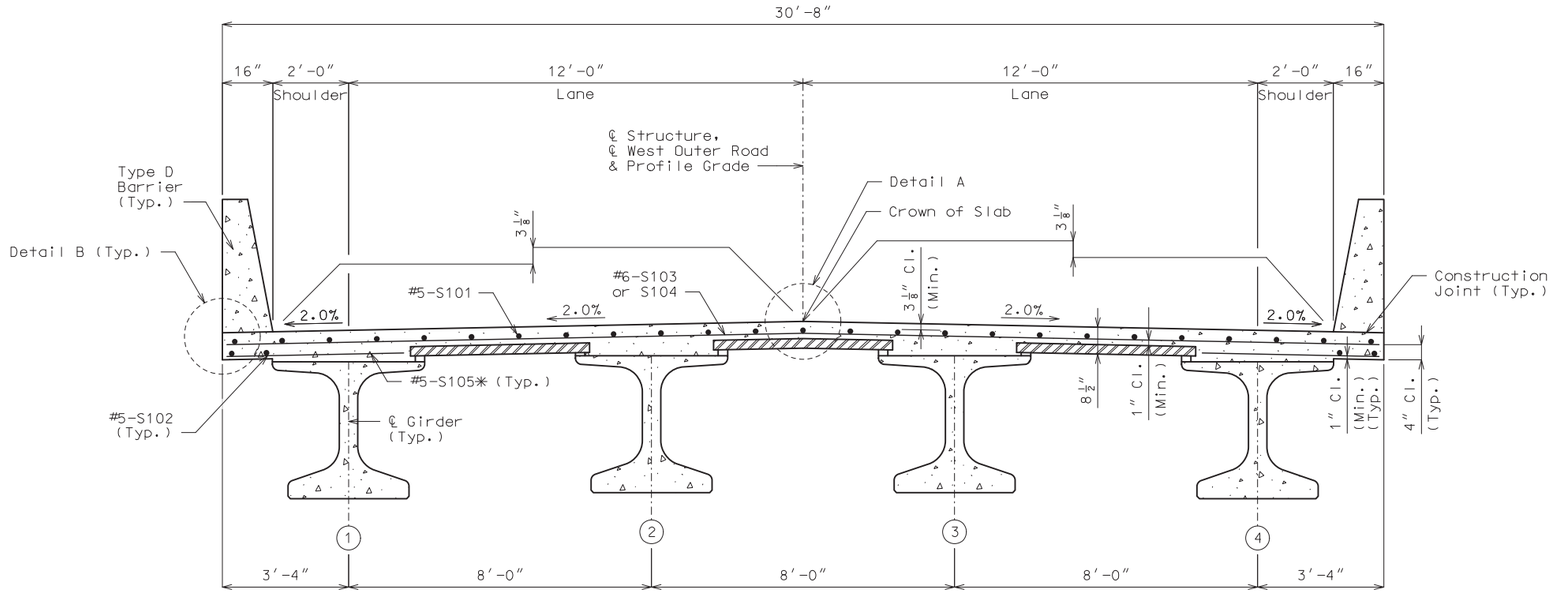
DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

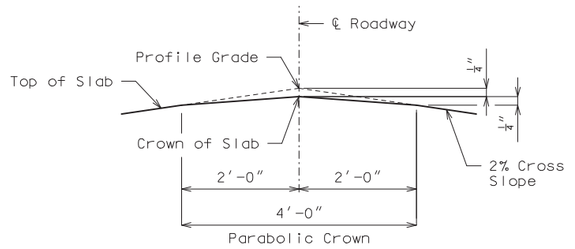
CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

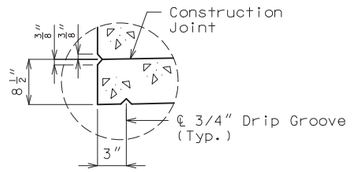


SECTION THRU SLAB

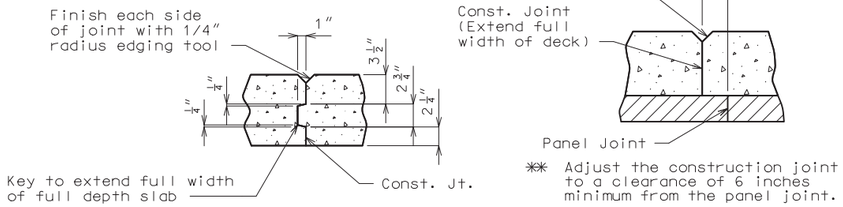
✳ Alternate bar shape available, see barrier sheets.



DETAIL A



DETAIL B



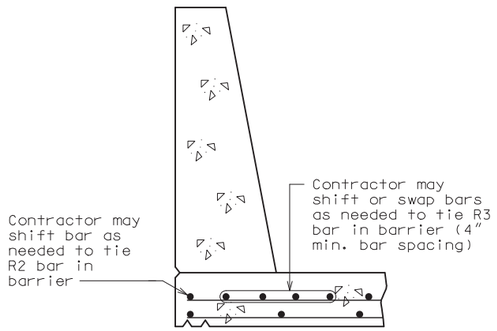
FULL DEPTH SLAB

✳✳ Adjust the construction joint to a clearance of 6 inches minimum from the panel joint.

SLAB ON PANELS

SLAB CONSTRUCTION JOINT

(If needed)



OPTIONAL SHIFTING
TOP BARS AT BARRIER

General Notes:

For details and reinforcement of Type D Barrier not shown, see Sheets No. 17 & 18.

For details of Precast Prestressed Panels, see Sheet No. 12.

For Theoretical Bottom of Slab Elevations, Girder Camber Diagram and Theoretical Slab Haunching Diagram, see Sheet No. 14.

For Plan of Slab Showing Reinforcement, see Sheet No. 15.

The contractor shall pour and satisfactorily finish the roadway slab at a rate of not less than 25 cubic yards per hour.

The contractor shall furnish an approved retarder to retard the set of the concrete to 2.5 hours and shall pour and satisfactorily finish the slab pours at the rate given.

The concrete diaphragm at the integral end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

DETAILS OF SLAB REINFORCING

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_016_J9P3751_Section_thru_Slab.dgn 10:25:23 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED
3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	16

COUNTY
BUTLER

JOB NO.
J9P3751

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9369

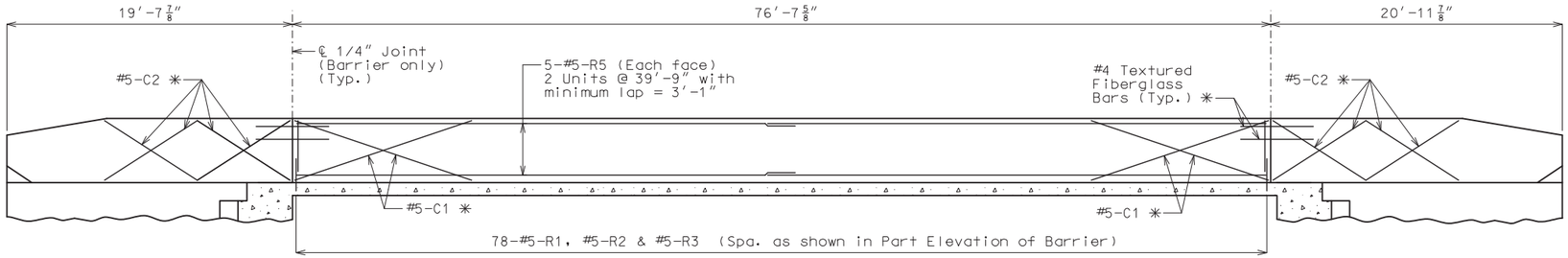
DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

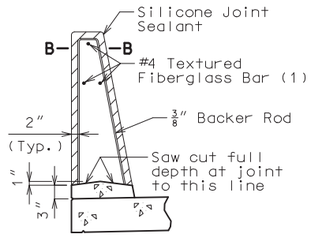
REV.



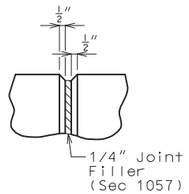
Span (1-2)

ELEVATION OF BARRIER

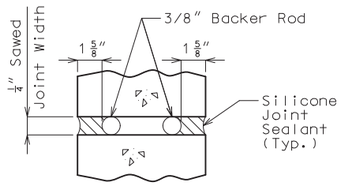
(Left barrier shown, right barrier similar by 180° rotation)
Longitudinal dimensions are horizontal.



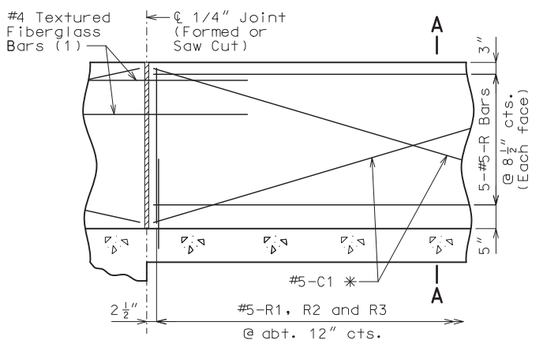
SECTION THRU SAW CUT JOINT



PART ELEVATION AT FORMED JOINT

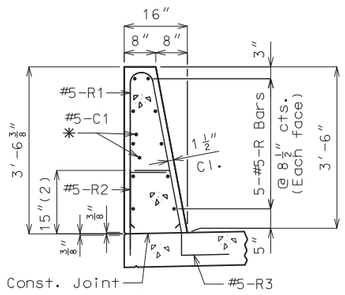


SECTION B-B



PART ELEVATION OF BARRIER

(1) Four feet long, centered on joint, slip-formed option only

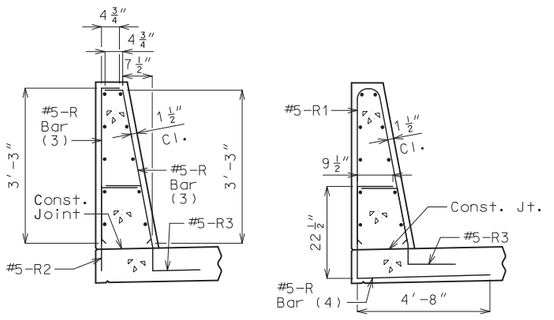


SECTION A-A

Use a minimum lap of 3′-1″ for #5 horizontal barrier bars.

The cross-sectional area above the slab is 3.52 square feet.

(2) To top of bar



R-BAR PERMISSIBLE ALTERNATE SHAPE

(3) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

(4) The R2 bar and #5 bottom transverse slab bar in cantilever (prestressed panels only) combination may be furnished as one bar as shown, at the contractor's option.

General Notes:

✳ Slip-formed option only.

Conventional forming or slip forming may be used. Saw cut joints may be used with conventional forming.

Top of barrier shall be built parallel to grade and barrier joints (except at end bents) normal to grade.

All exposed edges of barrier shall have either a 1/2-inch radius or a 3/8-inch bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for Type D Barrier per linear foot.

Concrete in barrier shall be Class B-1.

Measurement of barrier is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Type D Barrier.

Joint sealant and backer rods shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

For slip-formed option, both sides of barrier shall have a vertically broomed finish and the top shall have a transversely broomed finish.

TYPE D BARRIER

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_017_J9P3751_Barrier_Elevations.dgn 10:25:24 AM 3/3/2023

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	17

COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9369

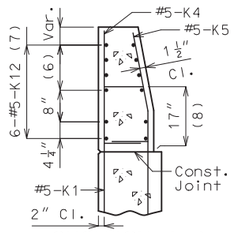
REV.	DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

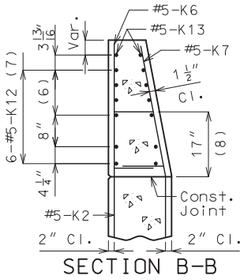
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

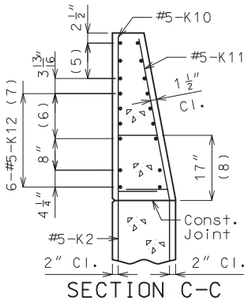
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



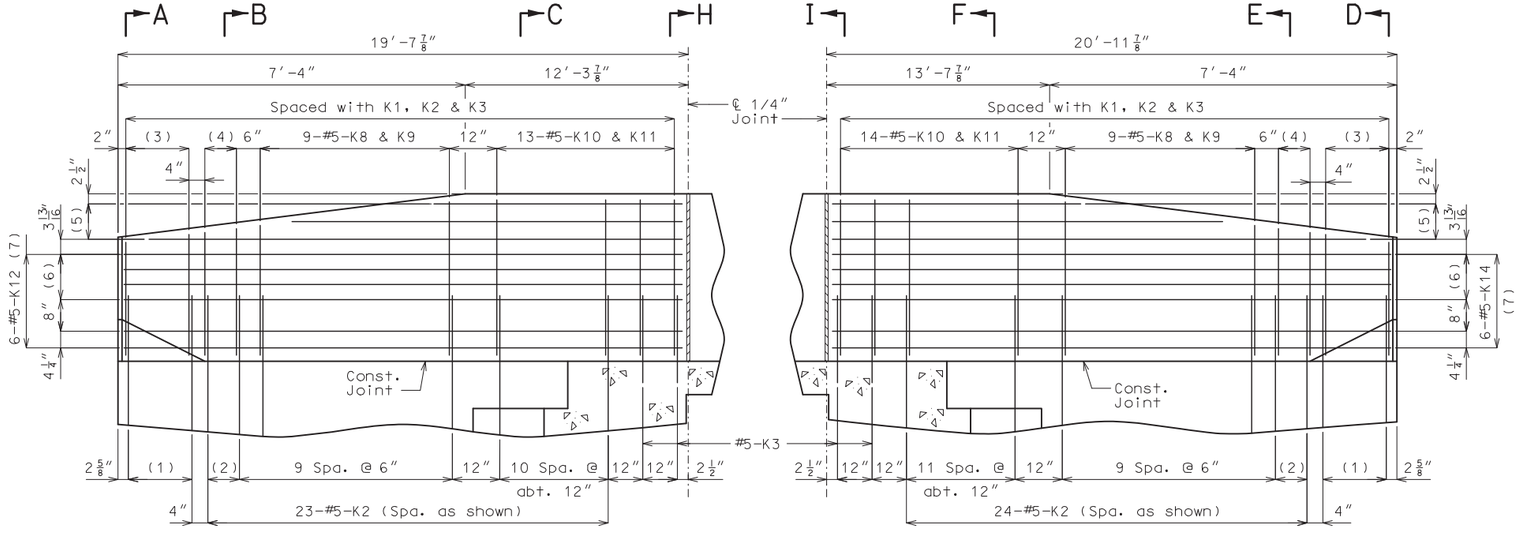
SECTION A-A



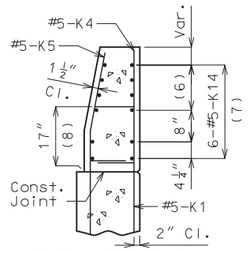
SECTION B-B



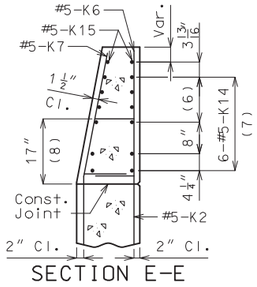
SECTION C-C



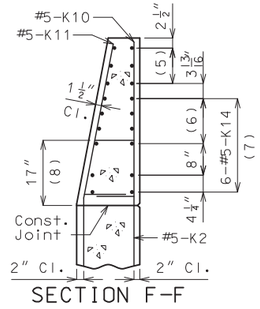
PART ELEVATION



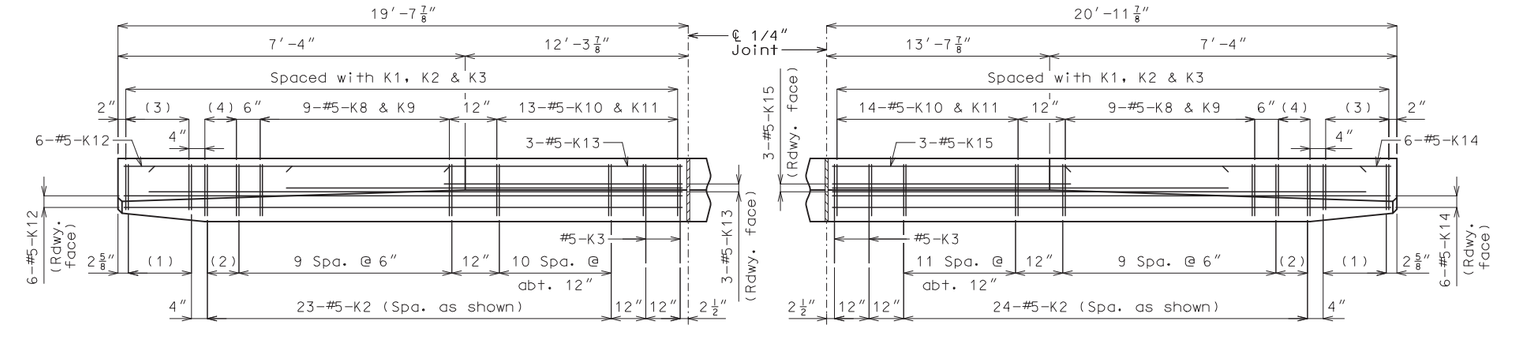
SECTION D-D



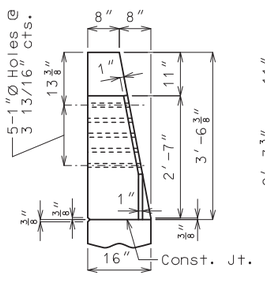
SECTION E-E



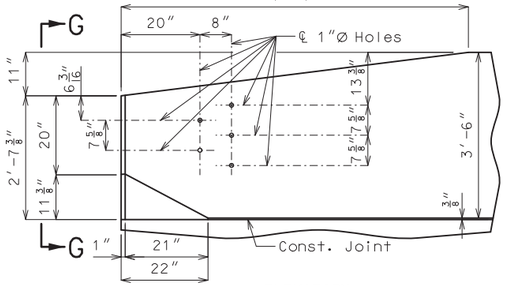
SECTION F-F



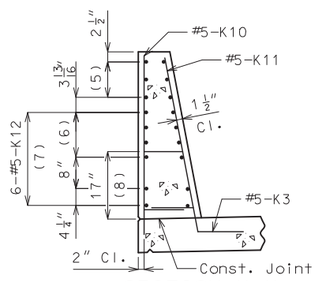
PART PLAN



ELEVATION G-G



ELEVATION



SECTION H-H

(1) 5-#5-K1 @ 4" cts.

(2) 2 spaces @ 4"

(3) 5-#5-K4 & K5

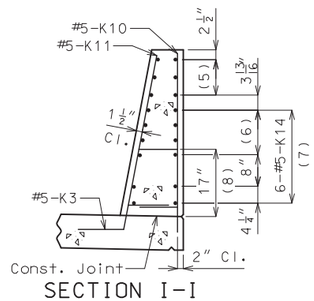
(4) 3-#5-K6 & K7

(5) 3-#5-K13 or K15 @ 4½" cts., each face

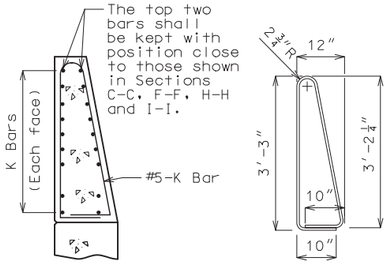
(6) 3 spaces @ 3 13/16"

(7) Spaced as shown, each face

(8) To top of bar



SECTION I-I

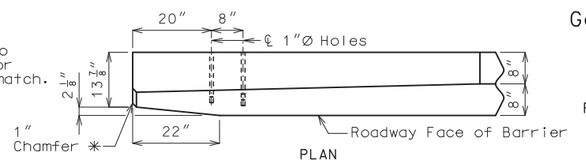


K10-K11 BAR PERMISSIBLE ALTERNATE SHAPE

(Other K bars not shown for clarity)

The K10-K11 bar combination may be furnished as one bar as shown, at the contractor's option.

All dimensions are out to out.



PLAN

✳ Transition to zero at Type A curb for gutter lines to match.

DETAILS OF GUARD RAIL ATTACHMENT

General Notes:

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Type D Barrier.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2" except as shown for bars embedded into end bent.

TYPE D BARRIER AT END BENTS

(Left barrier shown, right barrier similar by 180° rotation)

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 18 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	18

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9369

DESCRIPTION	DATE

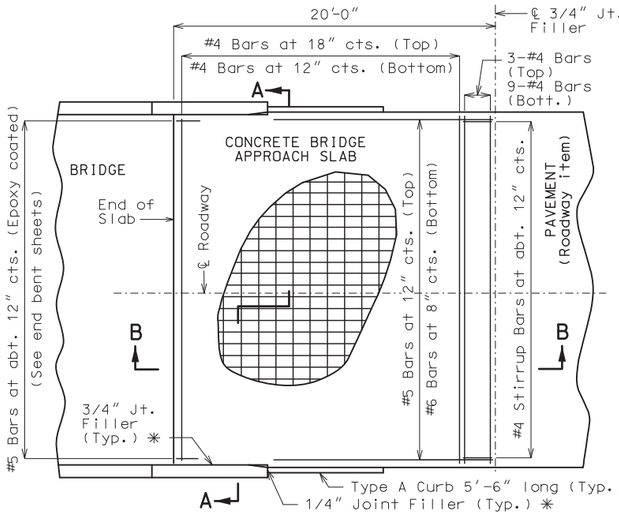
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

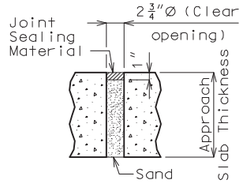
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631



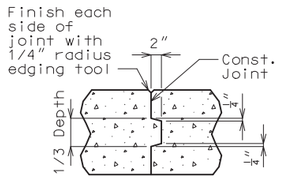
PART PLAN OF SQUARED STRUCTURE

(Skewed structure similar)

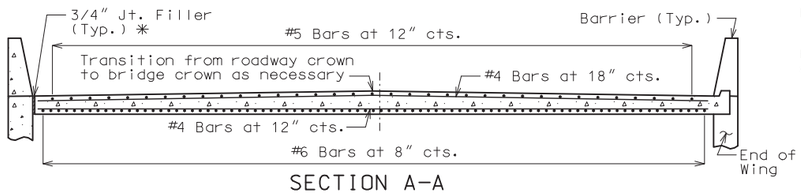


UNDERSEAL ACCESS HOLE DETAIL

(If required)

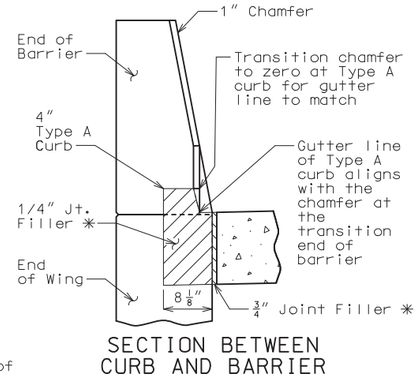


CONSTRUCTION JOINT DETAIL



SECTION A-A

With the approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



SECTION BETWEEN CURB AND BARRIER

Notes For Concrete Slab Only:

All concrete for the bridge approach slab shall be in accordance with Sec 503 (f'c = 4,000 psi).

The reinforcing steel in the bridge approach slab shall be epoxy coated Grade 60 with fy = 60,000 psi.

Longitudinal construction joints in bridge approach slab shall be aligned with longitudinal construction joints in bridge slab.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

The reinforcing steel in the bridge approach slab shall be continuous. The transverse reinforcing steel may be made continuous by providing a minimum lap splice of 23 inches for #4 bars, or by mechanical bar splice.

Mechanical bar splices shall be in accordance with Sec 710.

All joint filler shall be in accordance with Sec 1057 for preformed fiber expansion joint filler except as noted.

Payment for furnishing all materials, labor and excavation necessary to construct the concrete bridge approach slab, including the timber header, underdrain, Type 5 aggregate base, joint filler, and all other appurtenances and incidental work as shown on this sheet, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Minor) per square yard.

See Missouri Standard Plan 609.00 for details of Type A curb.

✳ Seal joint between vertical face of approach slab and wing with sealant in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

General Notes:

Contractor shall have the option to construct either slab except as noted.

The contractor shall pour and satisfactorily finish the bridge slab before placing the bridge approach slab.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

MoDOT Construction personnel will indicate the bridge approach slab used for this structure:

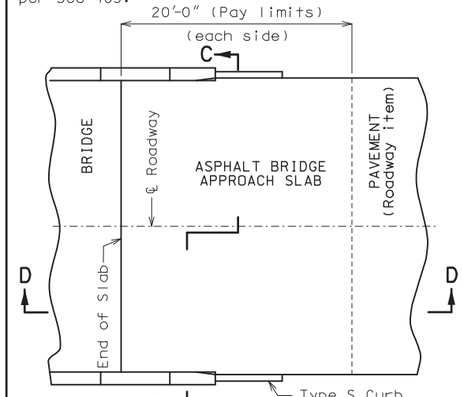
☐ Concrete Bridge Approach Slab

☐ Asphalt Bridge Approach Slab

Notes For Asphalt Slab Only:

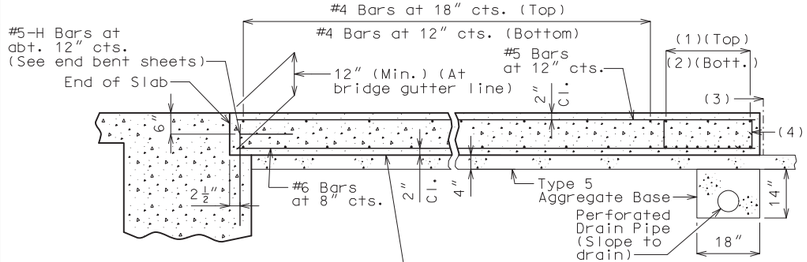
Payment for furnishing all materials, labor and excavation necessary to construct the asphalt bridge approach slab, including tack, curb, underdrain and Type 5 aggregate base within the pay limits shown, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Minor) per square yard.

Application of tack is required between lifts per Sec 403.



PART PLAN

(Squared structure shown, skewed structure similar)



SECTION B-B

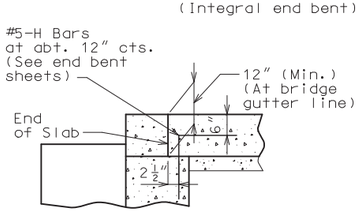
(Integral end bent)

(1) 3-#4 Bars

(2) 9-#4 Bars

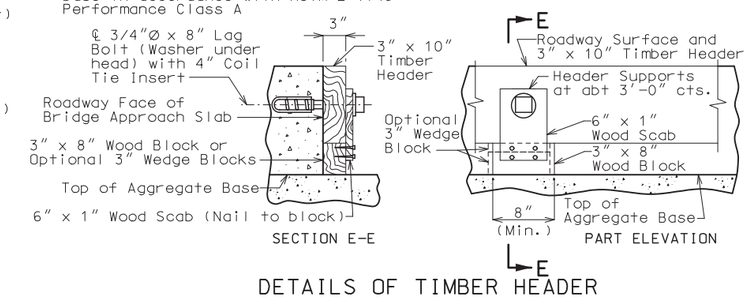
(3) ℄ 3/4" Jt. Filler

(4) #4 Stirrup Bars at abt. 12" cts.: 2'-0"x 8" (Min.) out to out; Actual length = 5'-10" (Min.); 90° stirrup hook at bottom; Stirrup height (8") and actual length vary due to crown.



PART SECTION B-B

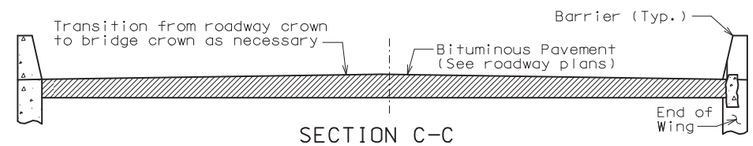
(Non-integral end bent)



DETAILS OF TIMBER HEADER

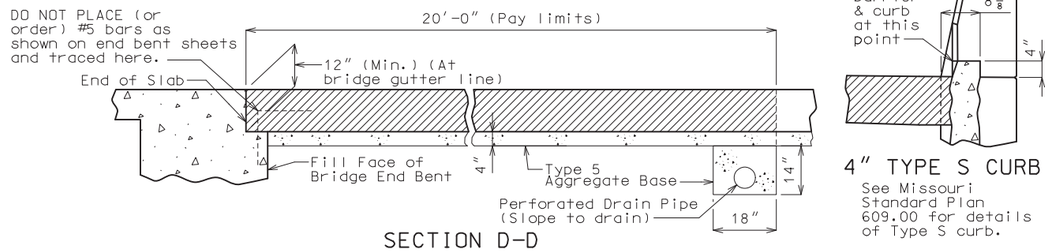
Remove timber header when concrete pavement is placed.

OPTIONAL CONCRETE SLAB



SECTION C-C

With the approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



SECTION D-D

OPTIONAL ASPHALT SLAB

(NOT ALLOWED WITH CONCRETE PAVEMENT)

4" TYPE S CURB

See Missouri Standard Plan 609.00 for details of Type S curb.

BRIDGE APPROACH SLAB (MINOR)

Integral end bents shown, non-integral end bent similar.

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	19

COUNTY: BUTLER

JOB NO.: J9P3751

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A9369

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

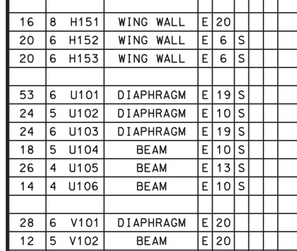
REV.

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK NO. MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			END BENT 1																									
10	6	F100	WING BRACE	E	23					2	3.000	4	6.750		14.000		13.000		5.250	2	1.000		10.250	8	0	7	9	117
10	6	F101	WING BRACE	E	15						14.000	9	6.000	2	3.000		10.250	2	1.000		13.000		5.250	12	11	12	10	193
4	6	F102	DIAPHRAGM	E	23					4	6.000	5	1.000							3	2.250	3	2.250	9	7	9	6	58
4	6	F103	DIAPHRAGM	E	21					7	10.750	5	1.000							5	7.000	5	7.000	13	0	12	9	77
28	5	H101	DIAPHRAGM	E	19					2	0.000		15.000											3	3	3	2	93
4	6	H102	DIAPHRAGM	E	20					43	0.000													43	0	43	0	259
4	7	H103	DIAPHRAGM	E	20					43	0.000													43	0	43	0	352
4	5	H104	DIAPHRAGM	E	23						15.250	3	3.000		15.250		10.750		10.750		10.750		10.750	5	10	5	9	24
9	6	H105	DIAPHRAGM	E	20					9	9.000													9	9	9	9	132
3	6	H106	DIAPHRAGM	E	20					6	5.000													6	5	6	5	29
6	6	H107	DIAPHRAGM	E	20					3	9.000													3	9	3	9	34
2	6	H108	DIAPHRAGM	E	20					2	1.000													2	1	2	1	7
8	7	H109	BEAM	E	20					43	0.000													43	0	43	0	704
4	6	H110	BEAM	E	20					43	0.000													43	0	43	0	259
16	8	H151	WING WALL	E	20					16	6.000													16	6	16	6	705
20	6	H152	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
20	6	H153	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
53	6	U101	DIAPHRAGM	E	19	S				3	3.000	7	0.000											10	3	10	2	810
24	5	U102	DIAPHRAGM	E	10	S						4	1.000	4	7.000									12	9	12	7	315
24	6	U103	DIAPHRAGM	E	19	S				3	0.250	5	3.000											8	4	8	2	295
18	5	U104	BEAM	E	10	S						6	2.000	5	3.000									17	7	17	5	327
26	4	U105	BEAM	E	13	S				5	3.000	2	8.000	5	3.000	2	8.000							16	7	16	4	284
14	4	U106	BEAM	E	10	S						2	8.000	5	3.000									10	7	10	5	98
28	6	V101	DIAPHRAGM	E	20					3	1.000													3	1	3	1	130
12	5	V102	BEAM	E	20					6	2.000													6	2	6	2	78
30	6	V151	WING WALL	E	20					7	1.000													7	1	7	1	320
30	6	V152	WING WALL	E	20					7	2.000													7	2	7	2	323
			END BENT 2																									
10	6	F200	WING BRACE	E	23					2	3.000	4	6.750		14.000		13.000		5.250	2	1.000		10.250	8	0	7	9	117
10	6	F201	WING BRACE	E	15						14.000	9	6.000	2	3.000		10.250	2	1.000		13.000		5.250	12	11	12	10	193
4	6	F202	DIAPHRAGM	E	23					4	6.000	5	1.000							3	2.250	3	2.250	9	7	9	6	58
4	6	F203	DIAPHRAGM	E	21					7	10.750	5	1.000							5	7.000	5	7.000	13	0	12	9	77
28	5	H201	DIAPHRAGM	E	19					2	0.000		15.000											3	3	3	2	93
4	6	H202	DIAPHRAGM	E	20					43	0.000													43	0	43	0	259
4	7	H203	DIAPHRAGM	E	20					43	0.000													43	0	43	0	352
4	5	H204	DIAPHRAGM	E	23						15.250	3	3.000		15.250		10.750		10.750		10.750		10.750	5	10	5	9	24
9	6	H205	DIAPHRAGM	E	20					9	9.000													9	9	9	9	132
3	6	H206	DIAPHRAGM	E	20					6	5.000													6	5	6	5	29
6	6	H207	DIAPHRAGM	E	20					3	9.000													3	9	3	9	34
2	6	H208	DIAPHRAGM	E	20					2	1.000													2	1	2	1	7
8	7	H209	BEAM	E	20					43	0.000													43	0	43	0	704
4	6	H210	BEAM	E	20					43	0.000													43	0	43	0	259
16	8	H251	WING WALL	E	20					16	6.000													16	6	16	6	705
20	6	H252	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499
20	6	H253	WING WALL	E	6	S				15	8.000		12.000											16	8	16	7	499

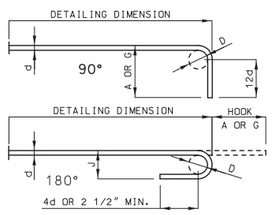
BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK NO. MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
53	6	U201	DIAPHRAGM	E	19	S				3	3.000	7	0.000											10	3	10	2	810
24	5	U202	DIAPHRAGM	E	10	S						4	1.000	4	7.000									12	9	12	7	315
24	6	U203	DIAPHRAGM	E	19	S				3	0.250	5	3.000											8	4	8	2	295
18	5	U204	BEAM	E	10	S						6	2.000	5	3.000									17	7	17	5	327
26	4	U205	BEAM	E	13	S				5	3.000	2	8.000	5	3.000	2	8.000							16	7	16	4	284
14	4	U206	BEAM	E	10	S						2	8.000	5	3.000									10	7	10	5	98
28	6	V201	DIAPHRAGM	E	20					3	0.000													3	0	3	0	127
12	5	V202	BEAM	E	20					6	2.000													6	2	6	2	78
30	6	V251	WING WALL	E	20					7	1.000													7	1	7	1	320
30	6	V252	WING WALL	E	20					7	0.000													7	0	7	0	316
			SLAB																									
50	5	S101	SLAB	E	20					45	4.000													45	4	45	4	2365
12	5	S102	SLAB	E	20					31	3.000													31	3	31	3	392
115	6	S103	SLAB	E	20					30	5.000													30	5	30	5	5254
112	6	S104	SLAB	E	20			V	2	29	11.500													30	0	30	0	
			INCR. = 0.5′							2	5.500													2	6	2	6	2734
166	5	S105	SLAB	E	20					4	8.000													4	8	4	8	808
			TYPE D BARRIER																									
156	5	R1	BARRIER	E	26					3	3.000		5.500	3	0.750					3	3.000		6.750	6	11	6	8	1085
156	5	R2	BARRIER	E	19	S					20.500		9.500											2	6	2	5	394
156	5	R3	BARRIER	E	27	S							9.500		15.250		5.000		12.000		15.000		3.000	3	6	3	4	543
40	5	R5	BARRIER	E	20					39	9.000													39	9	39	9	1659
20	5	K1	BARRIER	E	27	S				3	8.000		9.250		5.250	3	2.750				5.250		1.000	8	2	8	0	167
94	5	K2	BARRIER	E	27	S				3	8.000		9.250		14.500	2	5.750				14.250		2.750	8	2	8	0	785
8	5	K3	BARRIER	E	27	S					22.500		9.250		14.750		7.750		12.000		14.500		2.750	5	7	5	3	44
20	5	K4	BARRIER	E	19	S		V	4	2	4.250		10.000											3	3	3	1	
			INCR. = 0.5″							2	6.250		10.000											3	5	3	3	67
20	5	K5	BARRIER	E	14	S		V	4		8.250		9.500		18.500						4.000		18.000	3	1	2	11	
			INCR. = 0.5″								8.250		9.500		20.500						4.500		20.000	3	3	3	1	63
12	5	K6	BARRIER	E	19	S		V	4	2	6.750		10.000											3	5	3	4	
			INCR. = 0.5″							2	7.750		10.000											3	6	3	5	43
12	5	K7	BARRIER	E	21	S		V	4	2	6.750		10.000								2	6.000	6.250	3	5	3	4	
			INCR. = 0.5″							2	7.750		10.000								2	7.000	6.500	3	6	3	5	43
36	5	K8	BARRIER	E	19	S		V	4	2	8.500		10.000											3	7	3	6	
			INCR. = 0.75′							3	2.500		10.000											4	1	4	0	141
36	5	K9	BARRIER	E	21	S		V	4	2	8.500		10.000								2	7.750	6.750	3	7	3	6	
			INCR. = 0.75′							3	2.500		10.000								3	1.750	7.750	4	1	4	0	141
54	5	K10	BARRIER	E	19	S				3	3.000		10.000											4	1	4	0	226
54	5	K11	BARRIER	E	21	S				3	3.000		10.000								3	2.250	7.750	4	1	4	0	226
24	5	K12	BARRIER	E	20					19	4.000													19	4	19	4	484
12	5	K13	BARRIER	E	20			V	4	18	7.000													18	7	18	7	
			INCR. = 3′							12	7.000													12	7	12	7	196
24	5	K14	BARRIER	E	20					20	8.000													20	8	20	8	518
12	5	K15	BARRIER	E	20			V	4	19	11.000													19	11	19	11	
			INCR. = 3′							13	11.000													13	11	13	11	212
8	5	C1	SLIP FORM	E	20					12	0.000													12	0	12	0	101
16	5	C2	SLIP FORM	E	20					8	0.000													8	0	8	0	134



STIRRUP HOOK DIMENSIONS				
GRADES 40 – 50 – 60 KSI				
BAR SIZE	D (IN.)	90° HOOK HOOK A OR G	135° HOOK HOOK A OR G	135° HOOK APPROX. H
#4	2″	4 1/2″	4 1/2″	3″
#5	2 1/2″	6″	5 1/2″	3 3/4″
#6	4 1/2″	12″	8″	4 1/2″

NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2 1/4″	5″	3″	6″
#4	3″	6″	4″	8″
#5	3 3/4″	7″	5″	10″
#6	4 1/2″	8″	6″	12″
#7	5 1/4″	10″	7″	14″
#8	6″	11″	8″	16″
#9	9 1/2″	15″	11 3/4″	19″
#10	10 3/4″	17″	13 1/4″	22″
#11	12″	19″	14 3/4″	2′-0″
#14	18 1/4″	2′-3″	21 3/4″	2′-7″

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.

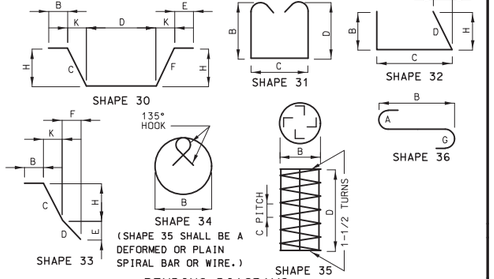
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

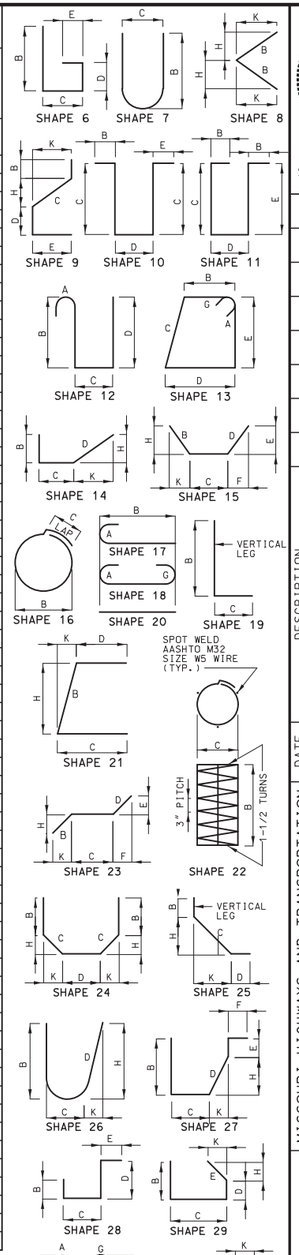
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.

REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.





STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	20

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

IF A SEAL IS PRESENT ON THIS SHEET IT HAS been ELECTRONICALLY SEALED AND DATED.

DATE	DESCRIPTION	REV.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

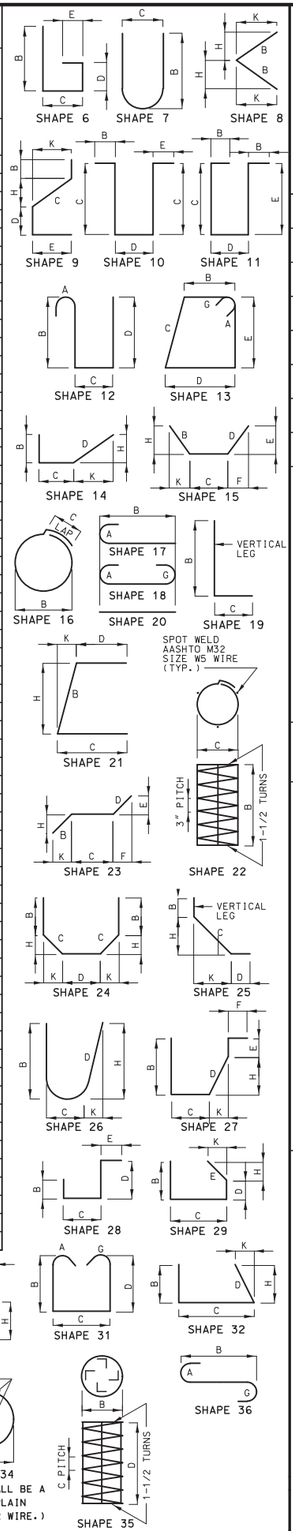
pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_020_J9P3751_Bill_of_Reinforcing1.dgn 10:25:28 AM 3/3/2023

BILL OF REINFORCING STEEL

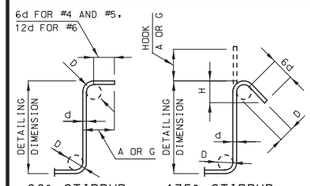
NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.
			TOTALS																									
	4			E																								764
	5			E																								12511
	6			E																								16060
	7			E																								2112
	8			E																								1410
			TOTAL	E																								32857
			SLAB ON CONCRETE NU-GIRDER																									
	4			E																								764
	5			E																								5239
	6			E																								16060
	7			E																								2112
	8			E																								1410
			TOTAL	E																								25585
			TYPE D BARRIER																									
	5			E																								7037
			TOTAL	E																								7037
			SLIP FORM OPTION																									
	5			E																								235
			TOTAL	E																								235

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	NOMINAL LENGTH FT.	NOMINAL LENGTH IN.	ACTUAL LENGTH FT.	ACTUAL LENGTH IN.	WEIGHT LBS.

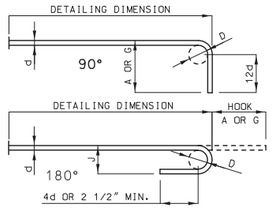


BENDING DIAGRAMS



STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK HOOK A OR G	135° HOOK HOOK A OR G	135° HOOK APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.

NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)

ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.

REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	21

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT

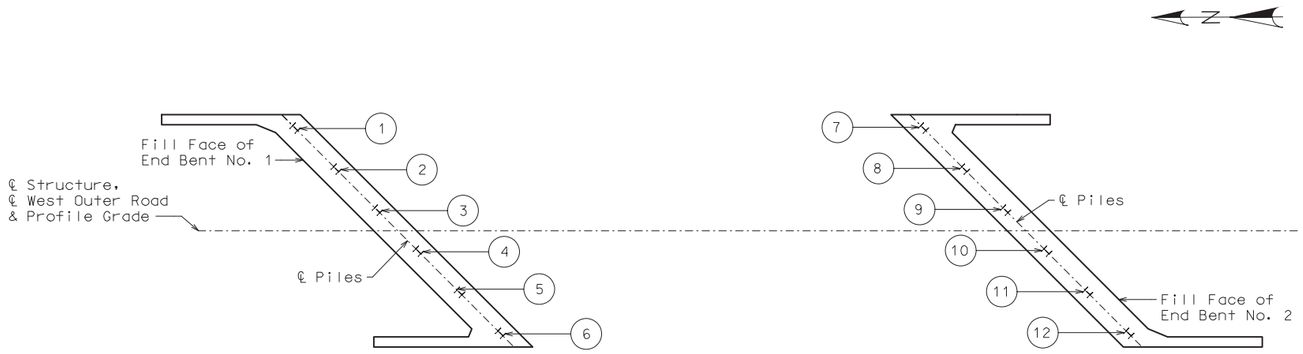
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_021_J9P3751_Bill_of_Reinforcing2.dgn 10:25:29 AM 3/3/2023



PART PLAN SHOWING PILE NUMBERING FOR RECORDING AS-BUILT PILE DATA

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent No. 1
1			
2			
3			
4			
5			
6			

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent No. 2
7			
8			
9			
10			
11			
12			

Note:
Indicate in remarks column:
A. Pile type and grade
B. Batter
C. Driven to practical refusal

This sheet to be completed by MoDOT construction personnel.

AS-BUILT PILE DATA

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED: 3/3/2023

ROUTE	STATE
67	MO
DISTRICT	SHEET NO.
BR	22

COUNTY: BUTLER
JOB NO.: J9P3751
CONTRACT ID.:
PROJECT NO.:
BRIDGE NO.: A9369

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

REV.

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-201

CLIENT MoDOT **PROJECT NAME** Route 67 over Harviell Ditch
PROJECT NUMBER 20284 **PROJECT LOCATION** Butler County, Missouri
DATE STARTED 12/7/21 **COMPLETED** 12/7/21 **GROUND ELEVATION** 303.7 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR Smith & Co. **DRILLED BY** Smith & Co **GROUND WATER LEVELS:**
DRILLING METHOD Hollow Stem Auger and Mud Rotary (CME-750) **AT TIME OF DRILLING** ---
LOGGED BY NB **CHECKED BY** CM **AT END OF DRILLING** ---
STATION 758+75 **OFFSET** 26' RT **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL - 6 inches										
		(CL) SANDY LEAN CLAY: Light gray, moist, stiff to hard	SPT SS1	100	5-6-7 (13)			4				45
			SPT SS2	72	6-11-15 (26)			10				52
			SPT SS3	94	9-17-17 (34)			6				28
10			SPT SS4	89	5-6-8 (14)			10				17
		(SP) SAND: Gray to grayish brown, moist, very loose to medium dense	SPT SS5	83	4-7-4 (11)			24				24
20			SPT SS6	89	1-2-1 (3)			21				16
			SPT SS7	44	5-2-2 (4)			23				31
30			SPT SS8	67	5-10-9 (19)			20				22
			SPT SS9	67	8-9-7 (16)			23				28
40			SPT SS10	61	9-12-14 (26)			21				21
			SPT SS11	61	7-7-12 (19)			22				23
50			SPT SS12	0	8-5-5 (10)							

(Continued Next Page)

B-201

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-201

CLIENT MoDOT **PROJECT NAME** Route 67 over Harviel Ditch
PROJECT NUMBER 20284 **PROJECT LOCATION** Butler County, Missouri

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SP) SAND: Gray to grayish brown, moist, very loose to medium dense *(continued)*										
		(SP) GRAVELLY SAND: Graysih brown, moist, medium dense	SPT SS13	56	9-8-8 (16)			16				31
60			SPT SS14	39	10-11-9 (20)			14				35
			SPT SS15	6	13-10-9 (19)			15				
70			SPT SS16	39	9-10-11 (21)			13				
		(SP) SAND: Grayish brown, moist, medium dense	SPT SS17	44	11-11-12 (23)			20				30
80		(SP) GRAVELLY SAND: Graysih brown, moist, very dense	SPT SS18	83	12-50/1"			13				

Refusal at 80.1 feet.
Bottom of borehole at 80.1 feet.

B-201

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 23
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9369

DATE	DESCRIPTION	REV.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

BORING NUMBER B-202

PAGE 1 OF 2

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

CLIENT McDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri
DATE STARTED 12/14/21 **COMPLETED** 12/15/21
GROUND ELEVATION 304.8 ft **HOLE SIZE** 6.25 inches
DRILLING CONTRACTOR Smith & Co. **DRILLED BY** Smith & Co
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger and Mud Rotary (CME-750)
▽ **AT TIME OF DRILLING** 19.50 ft / Elev 285.30 ft
LOGGED BY NB **CHECKED BY** CM
AT END OF DRILLING ---
STATION 759+88 **OFFSET** 44' RT
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL - 6 inches										
		(CL) SANDY LEAN CLAY: Grayish brown, moist, soft to medium stiff	SPT SS1	61	1-2-3 (5)			15				57
			SPT SS2	100	1-1-1 (2)			17				61
			SPT SS3	100	1-3-5 (8)			16				55
10		(SP-SC) SAND WITH CLAY: Light brownish gray to gray, moist, medium dense	SPT SS4	92	3-5-7 (12)			13				38
			SPT SS5	89	5-9-12 (21)			19				39
20		▽	SPT SS6	86	5-8-10 (18)			19				37
		(SP) SAND: Gray, moist, loose to medium dense	SPT SS7	44	1-2-3 (5)			20				60
30			SPT SS8	56	5-6-7 (13)			19				43
			SPT SS9	61	8-8-8 (16)			20				51
40		(SP) GRAVELLY SAND: Gray, moist, medium dense to dense	SPT SS10	67	5-8-12 (20)			19				39
			SPT SS11	64	4-3-10 (18)			20				24
50			SPT SS12	58	6-9-8 (17)			19				24

(Continued Next Page)

B-202

Bacon Farmer Workman Engineering & Testing Inc.
500 S 17th St
Paducah, KY 42003
Telephone: 2704431995
Fax: 2704431904

BORING NUMBER B-202

PAGE 2 OF 2

CLIENT McDOT
PROJECT NAME Route 67 over Harviell Ditch
PROJECT NUMBER 20284
PROJECT LOCATION Butler County, Missouri

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
		(SP) GRAVELLY SAND: Gray, moist, medium dense to dense *(continued)*										
			SPT SS13	0	4-6-6 (12)			18				21
60			SPT SS14	72	6-9-12 (21)			15				24
			SPT SS15	100	5-10-11 (21)			19				19
70			SPT SS16	61	8-13-12 (25)			17				24
			SPT SS17	72	8-9-15 (24)			20				23
80			SPT SS18	64	11-15-17 (32)			17				21
		Refusal at 83.0 feet. Bottom of borehole at 83.0 feet.										

B-202

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Detailed Jan. 2023
Checked Jan. 2023

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 24 of 24

STATE OF MISSOURI
JOSHUA D. JOLLIFF
NUMBER PE-2006002824
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 3/3/2023
ROUTE 67 | STATE MO
DISTRICT BR | SHEET NO. 24
COUNTY BUTLER
JOB NO. J9P3751
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9369

DESCRIPTION | DATE | REV.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CMT
© Copyright CMT, Inc.
CRAWFORD, MURPHY & TILLY, INC.
1631 WEST ELFINDALE STREET
SPRINGFIELD, MO 65807 (417) 869-6009
ENGINEERING CORPORATION - 000631

pw:\\cmtengr-pw.bentley.com:cmt-projects\Documents\Projects\MoDOT\20040908\Draw\Structures\Sheets\Harviell Ditch\A9369\B_A9369_024_J9P3751_Boring_Log2.dgn 10:25:45 AM 3/3/2023